

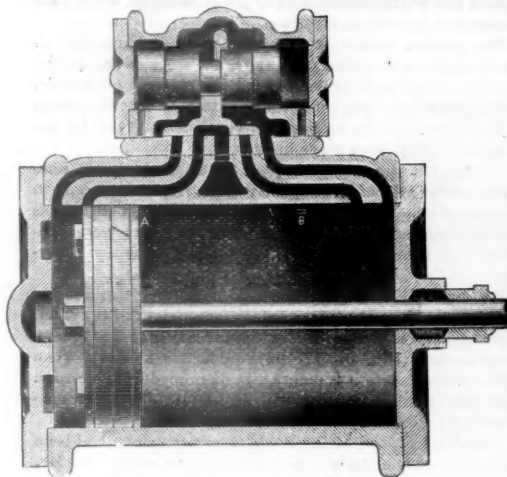


FRIDAY, SEPTEMBER 12.

The Hall Duplex Pump.

A new form of steam pump has lately been introduced by the Hall Duplex Steam Pump Company, whose works are situated in Brooklyn, L. I. The pump is of the class termed duplex, having two steam and two water cylinders, and the valves are shifted by steam pressure without the intervention of any tappets or striking pieces.

The accompanying section illustrates the interior arrangement, construction and operation of the steam valves. The engine of one division acts to operate the steam valve of the



Sectional View of Steam Cylinder Chest.
THE HALL DUPLEX PUMP.

other, and vice versa. In the accompanying view, the valve (which is a plain flat slide-valve) stands at the left of its stroke, admitting steam to the right of the main piston, moving it to the left. When the piston nearly reaches the end of its stroke and passes by the port A (at the top of the cylinder), a small portion of the pressure, which has been moving the main piston, passes through this port across to and shifts the valve of the other engine, which then makes its stroke and in a like manner admits steam across to reverse the valve of the former. It will thus be seen that by proper location of the ports, corresponding to A and B, in each cylinder, each engine must in its turn make a full stroke before giving steam to reverse the valve of the other. The admission of steam is timed so that each engine starts a little before the other stops. The location of the ports A and B, near the end of the stroke of the pistons, causes each in its turn to pause (while the other is making its stroke) for a length of time sufficient to allow the seating of the pump valves by gravity instead of by the action of the return currents.

The steam pistons cushion upon vapor entrapped in the ends of the cylinders by the pistons passing beyond the exhaust ports, the inlet ports at the end of the cylinder being closed by the main steam valve.

The valves at the water end are plain flat disks of composition, or hard or soft rubber working with a low lift upon a central stem.

The makers' trade catalogue contains the following list of questions, the replies to which should be given in ordering pumps. Information of this sort is often neglected by those who want a pump and who, being on the spot and knowing all the requirements, unconsciously fancy that the maker at a distance is equally well informed, when naturally he is entirely ignorant of the circumstances under which the pump is to work. Pumps are often wanted in a great hurry, and when hastily ordered by those at a considerable distance from the manufactory, it often happens that when the pump arrives it is found to be utterly unsuitable for its work, though a good pump of its kind. This simply arises from the fact that the maker has not been fully informed of the work the pump is expected to perform. Full replies to the following questions should obviate any such difficulty:

- First—For what purpose is the pump to be used?
- Second—What is the liquid to be pumped—is it hot, cold, clear, gritty, fresh, salt or acidulous?
- Third—What is the maximum quantity to be pumped per hour?
- Fourth—To what height is liquid to be lifted by suction?
- Fifth—What will be the length of suction pipe and the number of angles or turns?

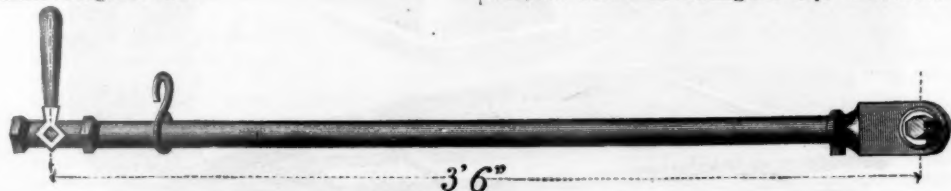


Fig. 2

METHOD OF APPLYING THE WESTINGHOUSE BRAKE ON A TRAIN RUNNING BACKWARD.

Sixth—What will be the length of delivery pipe and number of angles or turns?

Seventh—To what height or against what pressure is liquid to be forced?

Eighth—What is the pressure of steam used?

NOTE.—Care should be taken to guard against leaks in the suction pipe, as a very small leak impairs the effectiveness of the pump.

Braking Cars Running Backward.

The illustrations show the method adopted on the Pittsburgh, Cincinnati & St. Louis Railway for applying the Westinghouse brake on a train when switching or running backward. A hose-pipe complete with swan-neck and cock is coupled to the rear car, and the brakeman standing on the rear platform car applies the brake on the whole train by simply turning the cock. As cars are usually backed, the brakeman at the rear platform, who alone has a good view, and can best judge of the proper spot to stop, has only one hand brake, which is not of much use in stopping a train of cars.

Contributions.

The Cleveland Electric Railroad.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The length of track now prepared is something over three-quarters of a mile long; it turns sharp corners and crosses other street-car tracks without difficulty; in the centre of the car track is dug a trench 7 in. deep by 12 in. wide. On either side of this trench is laid a continuous insulated length of channel iron weighing about 5 lbs to the yard, the whole covered by two 1-in planks nailed on their inner edges, and so placed as to leave a space of 1/4 in. between them. The silt, etc., in the trench is swept by an attachment on the car into the man-holes conveniently placed and connected with the street sewers. The channel bars are charged with electricity conveyed by wire from a dynamo situated at the stables of the company, about half a mile distant.

The car used is an ordinary street car, seating about 20 people, 10 on a side. Between the axles there is added a third axle having attached to it an ordinary electric motor, which, when the circuit is complete, causes the axle to revolve. Hung from one of the sides by an iron frame is a small sheet of 1/2-in. iron which lets down into the trench through the opening, to the lower end of which are attached two brooms or pieces which are so arranged by springs as to be constantly in contact with each channel bar. This arrangement can be lifted or lowered when it is desired to take the car from the track, or in case of a run-off it lifts itself automatically. By means of wires the electricity caught in this way is taken to brass brooms set in a frame, on either side of a brass collar on the axle, which is connected with the driving motor. The frame is worked by a lever on either platform, and according to its position the car moves forward, backward, or stops, very much like the link motion on a locomotive. The contrivance is small and easily and expeditiously worked. All these attachments are below the car floor and protected from the dust by a tin hood. On either end of the driving axle is a grooved pulley about 18-in. in diameter, which, by a belt, transmits the motion to a similar pulley of about half its diameter placed on each of the other axles of the car. This belt consists of from two to four strands of wire spirally twisted like a spring, running in as many grooves. The inventor, Mr. W. H. Knight, of Cleveland, informs me that he can attain a speed of 10 or 12 miles an hour with a car loaded with people, using, as he expressed it, from two to three horse-power. At present the electricity is generated by a Brush dynamo, about a 16-light machine, I should think, run by a 40 horse-power engine, which the car company had at its stables to cut feed for its horses, etc., and which is now used for that purpose besides running the dynamo. One man attends to boiler, engine and dynamo, and is now using about one ton of coal per day. At present one car is used, which ordinarily does not make over six miles an hour. It runs eight hours, making four trips an hour, and has one man to manage it and a conductor. Mr Knight thinks he can, with two cars, make 64 trips a day at an expense not to exceed \$5.

The trip is made easily and comfortably, and the car seems to be under perfect control. I cannot give the cost of the attachments to the car, but outside of the royalty they cannot be very expensive, nor can they add very materially to the weight.

A. M.

"W. C. I.'s" Switching Problem.

JACKSON, TENN., Aug. 26, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

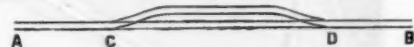
I herewith submit two solutions of "W. C. I.'s" problem in your issue of 22d inst.:

First Solution.—Assuming that the road runs east and west, both trains come to siding and stop. East-bound en-

gine cuts loose from train and goes in on east end of siding with empties, clearing main line. West-bound train pulls down and leaves train on main line, clearing both switches. Engine goes in on siding and backs the empties down on main line; the engine on east end of siding having in meantime run down on main line far enough to let the empties out. Engine then comes back through siding upon main line and backs her own train down far enough to clear east end of siding, then goes back and pulls east-bound train into siding, leaves it there, clearing main line and goes out on the main line, gets its own train and proceeds westward. Engine of east-bound train then backs its train and the 35 empties through siding until train is on main line and empties on siding. Engine then goes down on main line, gets its own train and proceeds eastward.

To get trains out on main line far enough to clear siding and leave empties on sidings so as to clear main line, it would be necessary to set brakes on several of the rear empties to stop them inside of switches and allow train to roll out on main line.

Second Solution.—East-bound train pulls up on main line and stands between switches. The engine of west-bound train shoves empties through siding out on the main line, and goes back, and pulls its own train through siding, letting east-bound train proceed. It then backs its own train down main line to clear east switch, cuts loose from



train and bring empties up main line and into east end of siding, one at a time, until all are in; then gets its own train and proceeds westward.

This is a problem, however, that will never occur in railroad, and we would like "W. C. I." to give us something practical.

W. H. T.,

Illinois Central Railroad.

SPRINGFIELD, Mass., Sept. 1, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The problem in switching of "W. C. I." of C., C. & I. R., in your issue of Aug. 22, would solve in following manner:

Let east-bound engine run up on siding at C, leaving train on main line. West-bound engine cuts loose from train, runs over and draws east-bound train inside of switches C D. East-bound engine backs out on main line A C. West-bound engine runs up end of siding from D, shoves empties out on main line at A C, backs over siding, couples on its own train, pulls up through siding out on main line at A C, couples on to east-bound train, backing up to clear C. East-bound engine shoves empties back on siding, west-bound engine draws both trains over switch C, east-bound engine backs off siding, couples on to own train, and both go on in opposite directions.

B. R. C. (Brakeman),

B. & A. R. R.

[We have also received answers to this problem from "B. B. N.," Lynn; "G. W. W.," New York; and "R. M.," Riverside, Pa. "J. H. W.," Malescus, Tenn.; "C. F. Barnhurst," Philadelphia, Pa., and one or two other correspondents suggest variations of "A. T.'s" problem, which admit of a very similar solution.—EDITOR RAILROAD GAZETTE.]

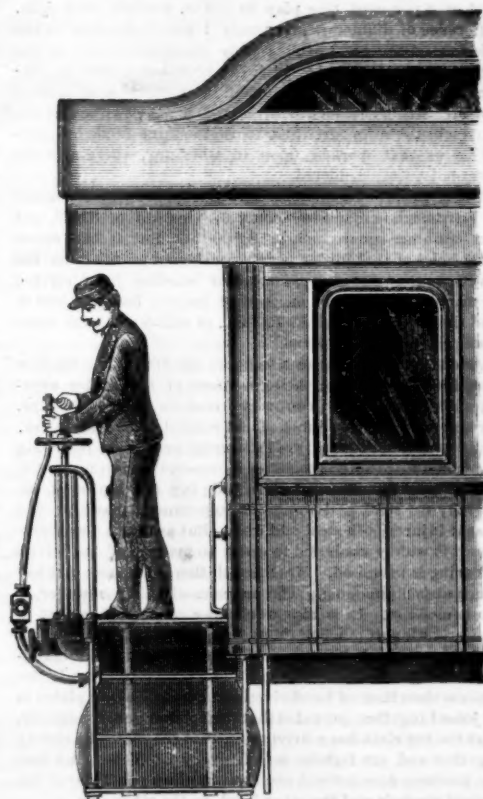


Fig. 1.—Method of applying the Westinghouse Brake on a train running backward.

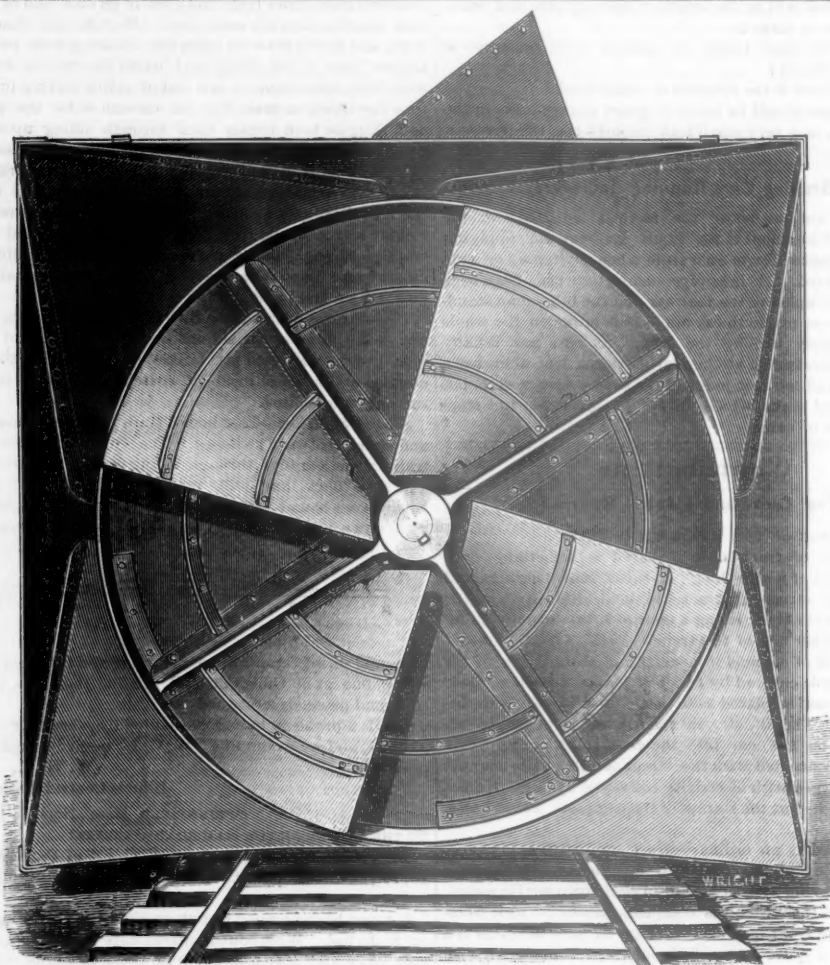


Fig. 1.—Front View, showing Revolving Knives.
ROTARY STEAM SNOW SHOVEL.

The Harkort and the Keystone Experiments Once More.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mr. Strobel thought it necessary to reply to my defense against his own attempts to discredit the 33 experiments made in Duisburg in Germany.

The short quintessence of his reply, conspicuously void of anything new or not self evident, is that he calculated the ultimate strength of the iron girder tested in Pittsburgh at 53,000 lbs., whilst it was printed to be 58,000.

When a riveted girder is tested and the ultimate strength is calculated, it is logically necessary to refer it to our usual formulae. But since the rivets shrink by cooling to the extent of 2 per cent. (the play in a 3 in. pin-hole with $\frac{1}{2}$ in. difference of diameters gives only 1 per cent.), and as the friction of the rivet-heads is only about one-fourth of the ultimate strength of the rivet, the rivet-holes must be subtracted in calculating the moment of inertia. And as not I but Mr. Strobel started with comparing the two sets of experiments, it seems desirable to use the same mode of calculation as that worked upon in Duisburg, where also the rivet-holes were deducted.

Doing this, the moment of inertia of the iron girder tested in Pittsburgh is found to be only 273 instead of 315.2, and the strain per square inch is 58,700 lbs. But if the upper rivet-holes of that girder were considered as filled by the rivets, as they never are, no matter whether hand riveted or machine riveted, the moment of inertia becomes 299.5, and the strain becomes 55,700 lbs., or still 5 per cent. more than given by Mr. Strobel.

And starting even with this figure (55,700), since the iron tested before and after the experiment of the girder averages 45,900 lbs., the iron was found to be 22 per cent. stronger after it was punched and riveted. And I again ask, Must we believe that the Pittsburgh process of punching the iron and nailing it together increases its strength by 22, and even by 28 per cent.? Punching is a rough process, especially for steel, and numerous experiments have proved that it injures both steel and iron. But as it is a cheap process it is widely used, and in order to make good its defects rimering is promised. Mr. Strobel, therefore, does not say much about punching. The machine-riveting, however, is made much of. It is also a cheaper process than that of hand-riveting, if much plain and regular work is to be done, and this was probably the predominant reason why manufacturers have adopted it. It is most probably also a better process than that of hand-riveting in case of many plates to be joined together, provided that the holes match excellently, that the hot rivet has a driving fit, that the plates lie closely together and are tightly bolted every 12 inches, and that the machine does not put one rivet-head on one side of the axis of the hole and the other head on the other side.

When, in 1878, a part of the Sixth Avenue Elevated Railroad of New York, which had not been designed with a sufficient number of rivets in some parts, was reinforced and re-riveted, I started a collection of samples, and of all

over the road, and on the part which consists of machine-riveted work only, numerous loose rivets were found and were replaced. In some girders I saw that all rivets of one chord were taken out and replaced by hand-riveting. Moreover, I also have in my possession some rivets from a certain shop where chrome and other steel bridges were built. I did not like their exterior and had them taken out, when the rivet-holes were found too wide, perhaps rimered too well, and the rivets to have assumed a twisted form, as if they were intended to become cork-screws. Lately I have had an opportunity to visit a ship-yard in this neighborhood, where I saw another sample of machine-riveting which was worse and more dangerous than anything I ever noticed of this class of work.

Rivets driven by pressure are apt to ooze between the plates, and if the heads are cut off it is found to be very difficult to remove the stumps. This is pronounced to be a sign of fine workmanship, and of great strength, while I am inclined to the contrary opinion.

The girders tested at Duisburg were all hand-riveted. Their angles were rolled from the same stock as the plates. Tests had been made previously on all classes of material, plates and angles, this being the condition of allowing them to be drilled. Of the broken girders the tests given by me (Jan. 26, 1883), were made in addition.

The holes were not punched, but drilled, and after assembling for the sake of riveting they were rimered, except in such cases where the holes were drilled through all plates and thicknesses at once. The heads of the rivets were provided with counter-sunk fillets, this being done by rimering.

The diameter of the rivet-holes, as usual, was 1 millimetre less than the diameter of the hole. The weight of the riveting-hammers is prescribed by specification to be 7 to 8 kilogrammes ($15\frac{1}{2}$ to $17\frac{1}{2}$ lbs). The rivet work when finished, and before it is painted, is examined by the inspectors with small hammers, and any doubtful rivet is condemned by these experienced engineers and is replaced.

If the steel girders of the Harkort experiments had been hand riveted, and the iron girders machine-riveted, then Mr. Strobel, perhaps, could have had a handle for attack, but as they were all treated in the same manner, they are comparable; and if he talks of their poor results, he only says so in order to depreciate the value of these experiments, and thereby to sustain those made at the works where he is an employé, where, of course, the care used in examining and selecting the right kind of steel, where the process of annealing, etc., etc., has been brought to such a compass as to outshine all the rest.

I repeat, among the Harkort experiments there were plenty of good results, and better than those obtained at Pittsburgh. It is the irregularity of the results and the average which has to be considered. If this average is not very much better than the average of the results with good

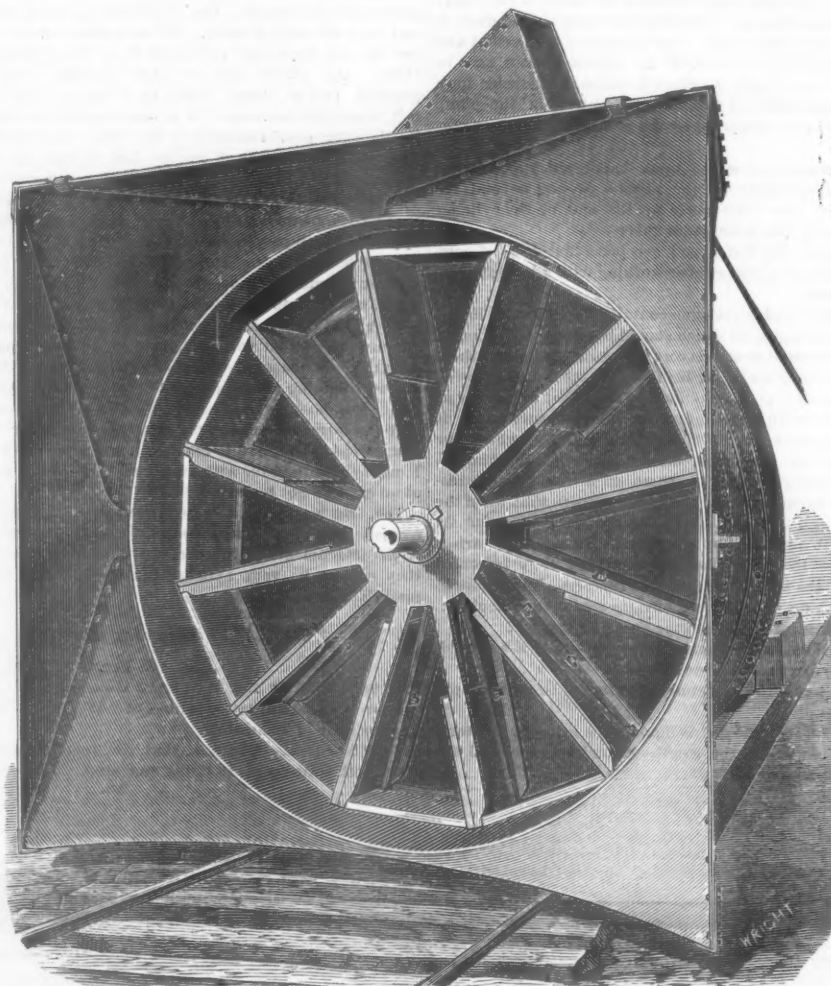


Fig. 2.—Front View, showing Revolving Shovel, the Knife Wheel being removed.
ROTARY STEAM SNOW SHOVEL.

iron girders, and if the variations of strength are not confined within sufficiently small limits, then it is not of much use to go into experimental steel bridge-building. We have iron bridges, such as the Lang in, the Mayence, the Britannia, etc., bridges strained as high as 14,000 lbs. per square inch, and without any sign of the beginning of failure, so far as strength is concerned.

Nor is it by any means certain that the greater ultimate strength of material found as the result of a single experiment is the proper standard of value. I should like to see steel eye-bars and others made of good iron tested under repeated impacts, say up to 20,000 lbs. per square inch, so as to learn which of the two stands the greater number of repetitions, or whether the difference is practically important.

Not many years ago steel rods were put into bridges in America in lieu of iron rods, which were no longer of sufficient size to sustain the increased rolling loads. But whereas the iron rods had not broken, the steel rods did so in a very short time. Mr. J. M. Wilson, of Philadelphia, wrote that "he had made use of it (steel) for repairing and strengthening some old structures where heavier rods of

well), and it is not smaller for the higher pressures at which the "steel girders failed."

But, in short, what is the value of experiments made with an antediluvian hydraulic press mounted with a mercury gauge, of which the variable co-efficient of friction is an unknown quantity?

I do not intend to enter into the rest of Mr. Strobel's cavils, and I cannot agree that we already know to what extent steel is more economical than good iron. In order to learn this or to know whether we really do save anything by using steel in bridges I venture to say that we must have experiments more carefully made and better interpreted than those which Mr. Strobel wishes us to accept.

LONDON, Aug. 5, 1884.

C. B. BENDER.

Rotary Steam Snow Shovel.

The accompanying illustrations show a novel form of a machine for the purpose of clearing a railroad when blocked by a heavy fall of snow. The machine is constructed to bore into a snow drift, cutting a channel through it, and

shows the arrangement of the steam cylinders and gear wheels employed to work the machine. When at work, this part of the machine is boxed in to protect it from snow, but the illustration shows the casing removed, in order that the construction of the machine may be plainly visible. The main shaft is of forged steel, 6 in. diameter, and the hollow shaft carrying the shovels is 10 in. in external diameter, and is of cast steel. The main gear wheels are also of cast steel, and weigh 1,000 lbs. each. The back of the drum in which the shovel revolves is of $\frac{3}{4}$ in. steel boiler plate, and the sides and knives are of $\frac{3}{4}$ in. steel plate, stiffened with $3\frac{1}{4}$ in. angle irons. The main bearing taking the overhanging weight of the knives and shovels is 21 in. long, and the rear bearing of the hollow shaft, placed in the centre of the nest of gear wheels, is 16 in. long. The rear end of the solid shaft is carried by a thrust-block bearing similar to that for an ocean steamer.

The $6\frac{1}{4}$ in. steel gusset plates stiffening the shovel casing are secured to a steel bed-plate which also carries the main bearing, and ties the main parts of the machine together. The gussets are secured to the back plate by double $3\frac{1}{4}$ in.

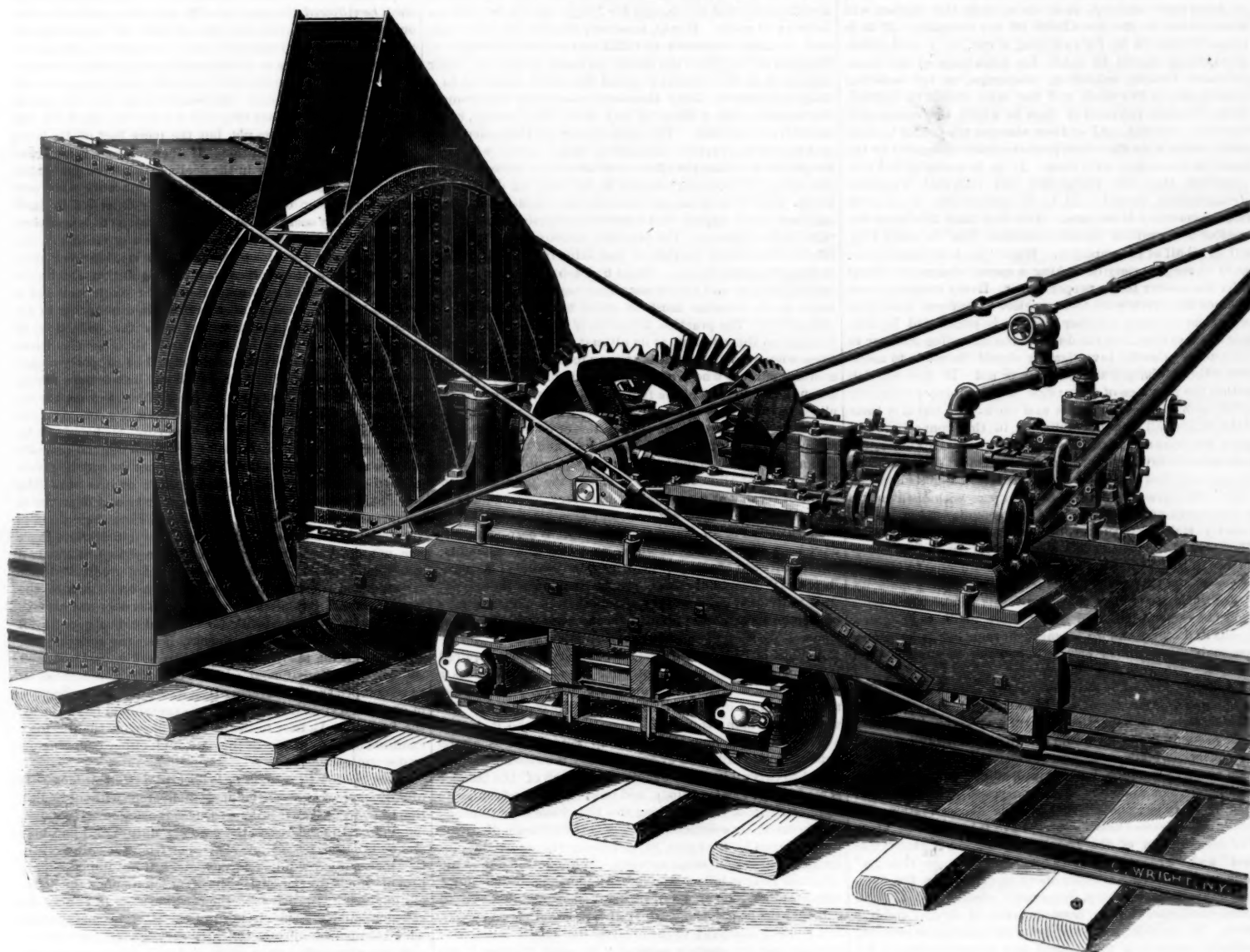


Fig. 3. General View, showing Engine and Gear Wheels.

ROTARY STEAM SNOW SHOVEL.

iron could not be introduced. Its behavior under service had not been very satisfactory." (Min. Prac. I. C. E.).

What Mr. Strobel says of Navier's hypothesis (this high authority is called upon for a matter of which he was not the author), constant modulus and so on, is too elementary and has no bearing to the subject.

We know that if, according to the old theory, the absolute strength is calculated from an experiment of a thick bar tested under flexure to its rupture, this imaginary absolute strength is greater than the tensile strength of the bar. But if a riveted girder with a thin web is tested, we find less than the ultimate strength, sometimes only 50 per cent. thereof. The Pittsburgh experiments, however, gave considerably more.

I believe that the Pittsburgh testing machine is not to be trusted, and I have mentioned that the late Mr. Griffen told me that this machine gave 10 per cent. better results than the Phoenixville press, or that it acted with 10 per cent. more friction. Mr. Strobel apparently does not know that the co-efficient of friction of a hydraulic press is not a constant fraction. It is very variable, and if he will apply to Messrs. Riehle, of Philadelphia, he can learn that the frictional coefficient increases up to about 50 per cent. It increases with the pressure per square inch of the plunger, just as all frictional co-efficients increase with high pressures (authority, G. Rennie; see also the book by C. H. Has-

throwing the snow from the cut a considerable distance to one side of the track.

The front end of the machine carries a powerful knife-wheel 9 ft. in diameter, provided with four heavy steel knives running at from two to three hundred revolutions per minute, cutting the snow 10 ft. wide in slices 12 in. thick, depositing it on 12 powerful rotary shovels revolving in a drum at the same rate of speed but in an opposite direction to the knife-wheel which forms the front head of the drum. These rotary shovels throw the snow through a shoot on top of the drum, delivering it in a direct stream beyond the railway fence or over the top of deep cuttings.

The knife-wheel and shovels are driven by two powerful engines, with their own boiler, tank and coal-bunk complete, all of which are built upon a solid car frame.

The rotary knife wheel is carried by a solid shaft, and the rotary shovels behind the knife wheel by a hollow shaft revolving round the solid shaft.

It will be seen that the principle of the machine resembles that of an auger, the knife wheel cutting the chips and the rotary shovel throwing them out of the way. We have not witnessed the machine in actual operation in snow, but as far as can be judged from the working of a model in sand, the machine will be very effective.

The knife wheel is shown in fig. 1. Fig. 2 shows the revolving shovels, the knife wheel being removed. Fig. 3

angle irons. The bottom of the casing is secured to the end sill of the car by an angle iron and the thrust is taken by an inclined strut, which is clearly shown in the illustration.

The square cutter which trims the bank of snow is stayed to the car by truss rods as shown.

The cylinders used on the first machine constructed measure 12 in. by 14 in., but the size can be increased, if thought desirable, so as to give an ample margin of power.

The boiler is carried on the rear end of the car, but is not shown on our illustration.

A separate flanger (which is not shown in the illustrations) is used to clear the rails of snow.

The casing projecting in front of the rotary knives is about 10 ft. square, and as its bottom, top and sides slope in toward the knives, the latter are fed with snow from the sides of the cut, and as the knives revolve, the snow is sucked in and disposed of by the shovel.

The knives and other revolving parts are carefully balanced, a very necessary precaution at the high speed adopted. The balance weights may be seen attached to the lower part of the knife wheel shown in fig. 1.

To guard against the choking of the knives with snow, the shovels have double the capacity of the knives, so as to clear the knives of snow as fast as it is cut.

The first machine of this kind was the result of numerous experimental models, made by Mr. Orange Jull, of Orange-

ville, Canada. The machine was first tried in the yard of the Canadian Pacific Railway, at Toronto, Canada, April 1 last. The right to build the machines in this country was then purchased by the Rotary Steam Snow Shovel Manufacturing Company, of Paterson, N. J.

Any further information may be obtained from Mr. J. S. Leslie, the President of this corporation.

Miscellaneous Charges—Freight Credits.

[From Marshall M. Kirkman's forthcoming work on "The Theory and Practice of Collecting Railway Revenue Without Loss."]

(Copyright, 1884, by Marshall M. Kirkman.)

The Difficulty of Enforcing Miscellaneous Charges.—There are many unusual services performed by railroad companies, in connection with the handling of traffic, that are not covered by the printed schedule of rates. These services are incident to transportation, but not usual to it under all conditions. When they occur, therefore, they constitute a special charge; these charges form what are termed "Miscellaneous Collections." Many of these charges are, in the nature of things, wholly dependent upon the watchfulness and fidelity of the agent and his assistants. If overlooked, or knowingly omitted, it is quite likely the neglect will never come to the knowledge of the company. If it is proper to exact a fee for switching a car, or a well-understood charge should be made for demurrage or for transshipment, loading, unloading, coopersage, or for watering or attention to live stock, and the same should be omitted, shippers escape payment of dues to which the company is rightfully entitled. All of these charges are proper in their place, but a wide discretion is unavoidably delegated to the agent in connection with them. If he is watchful and conscientious they are recognized and collected whenever circumstances permit. If he is inattentive or neglectful, the contrary is the case. The fact that this large discretion is permitted should stimulate him to exert himself in behalf of his employer. Where he is in doubt in regard to the propriety of making a special charge, he should refer the matter to the proper officer. Every company loses more or less every year from neglect to enforce these miscellaneous charges; whether this loss is occasioned by neglect or otherwise, it is the duty of the Traveling Auditor to determine. Careful investigation should be made to ascertain whether charges are enforced or not. It does not fall within the province of their office to determine arbitrarily when such charges are proper and when not, but it is their duty to note all seeming omissions in this connection and make a special return of the same to their superior officer for reference or investigation. The enforcement of the various charges and fees that come under the head of miscellaneous collections have always been looked upon with disfavor by a large part of the public. They recognize them as abstractly right and proper, but as wrong in the concrete. They seek therefore to evade them in every way. In consequence of this disposition employees are subjected to unusual pressure, and they gain immensely in personal popularity by neglecting to enforce charges of this kind. These facts are to be remembered, and every effort made to enlighten agents and others and to strengthen their hands in every reasonable and proper effort they make to enforce such charges.

Imperfect Method of Accounting for Miscellaneous Collections—The New Form of Way-Bill.—One of the most difficult things in connection with railway accounts has been to devise a method that would secure to a railway company all collections made on its account for miscellaneous services, such as extra baggage, loading, unloading, storage, switching, demurrage, and other special purposes. The practice of making extra baggage charges payable at destination, and many other devices now in force, have this object in view. The introduction of the freight way-bill containing "Unpaid" and "Prepaid" columns for "Miscellaneous Charges" is designed to secure a better check on collections for loading, unloading, switching, demurrage, storage and kindred items incidental to the transportation of freight and live stock. No trouble has ever been experienced in securing faithful accounting for unpaid and prepaid charges for freight. The reason is that the public hold a receipt for every item of charges collected for such purposes. It is the possession of these receipts by the public (receipts corresponding to the transaction as it appears upon the way-bill and in the accounts) that makes the accounting for freight charges so simple and effective. The object of the new way-bill referred to above is to throw around the miscellaneous collections the same safeguards that have proved so effective in connection with charges for freight proper. If there is a miscellaneous charge of any kind connected with a consignment of freight, the amount of such charges must appear in the receipt. It must not be aggregated with other charges, but must be specific and clear, and no collection is authorized that does not state the purpose for which it is made. Many of these receipts pass from the holders to the officers of the railroad company in connection with the settlement of claims and for other purposes. When thus received the railroad company should immediately compare them, item by item, with the returns previously rendered for moneys collected on these accounts by the persons signing the receipts. The likelihood that these evidences will pass into the possession of the railroad company, and that the above comparisons will be instituted in all cases, will have the effect to secure faithful accounting where it could not be attained in any other way. It has been the practice quite generally in the past to group as many items of this kind as possible in a receipt. Thus, if a consignee was charged \$2 switching charges on each car received by him, this charge was not entered in the receipt

given for the local charges on such car. Sometimes no receipt whatever was given; or the items for perhaps all the cars delivered in a week or month were aggregated and a receipt given for the whole. These practices rendered it difficult for a railroad company to ascertain whether charges collected on particular consignments were accounted for or not. If, however, collections for miscellaneous purposes are specified in detail on the receipt for the particular consignment they affect, and are embraced in the returns the same as freight charges, it is exceedingly simple and easy for the railroad company (when the receipt comes into its possession) to ascertain whether the amount specified in the receipt has been returned by the party collecting it or not. When the receipt passes into the possession of the railroad company it should be compared with the returns and thus serve to verify the correctness of the latter. It is important that this, like all other requirements surrounding the collections of freight and passenger traffic should be duly and properly understood by agents and others, and that all methods and devices, whatever they may be, for securing faithful accounting therewith, should be carefully observed.

Uncollected Freight—Why Charges Should be Collected on Delivery of Property.—It was at one time a generally accepted rule that all charges for freight should be paid on delivery of goods. It was, however, found to be inconvenient in many instances to fulfill this necessary obligation. Shippers did not have the money on hand, or they had other uses for it, or they sought to avoid the labor involved in a daily settlement. They therefore ceaselessly importuned the carrier to allow them to pay their bills weekly, semi-monthly, or monthly. The persistency of these demands and the desire of rival companies to cater to the wishes of the public have had the effect to make serious inroads on the old custom of requiring charges to be paid on delivery of goods. The effect of this is to increase enormously the working fund or idle capital that a railroad company must maintain in its business. The practice, moreover, has had the effect of increasing the risk of bad debts from creditors unwilling or unable to pay. These bad debts or losses to the carrier must be and are eventually recouped by it in other ways, as its revenue must be equal to its just and proper obligations. The practice, however, is not the less objectionable on this account, as its ultimate effect is to compel those who are willing and able to pay to make good the shortcomings of those who are unwilling or unable to pay. On this account, and in view of the fact that the service is much simplified thereby, it is extremely desirable that railroad companies should return to the old practice of collecting charges from everybody on delivery of freight, and for these reasons agents should endeavor as much as possible to restrict the practice of allowing credit. Where the practice is the result of rivalry at competing points every effort should be made to reconcile these rivalries and arrange for the common collection of all charges on delivery. Where customers have been allowed time in which to settle their accounts, the withdrawal of this privilege may be esteemed a hardship, but it is certainly more proper that men should pay their individual debts as they accrue than to make them a burden on the general public, as is the case when they ask common carriers to extend them financial aid.

A "List of Uncollected Freight Bills" should be required to be made at frequent intervals by all agents; it is a valuable and necessary statement and invites at all times the careful and intelligent scrutiny of the company. It is valuable for many things; it shows in detail who it is that owes the various sums that make up the enormous aggregate of unpaid bills that every company is unavoidably compelled to carry; it shows exactly how much of the balance is made up of local earnings, and how much of advances to connecting lines, and how long the bills have been unpaid; and in the latter connection it evinces the measure of capacity displayed by the agent in collecting the sums due for transportation and other services. Without the list of uncollected freight bills it would be impossible to determine with certainty one of the constituent elements that go to make up the large balances that always stand on the books of a railway company to the debit of its agents. But with this list, and the station agents' "Account Current," the accuracy of these balances can be fully demonstrated and their necessity determined.

Extending Credit to Consignees—Importance of Collecting on Delivery of Property.—The practice of permitting freight to pass out of the possession of the carrier without payment of charges was, at one time, confined wholly to competing points, and was very much restricted even in such cases. The tendency, however, to enlarge this privilege and to extend it to non-competitive points, is constantly growing. Pressure upon the carrier for accommodation of this kind is universal and persistent. If the agent cannot be influenced or cajoled, appeal is made to his superior, and no device is left untried to secure the coveted favor. The claim usually made is that it is inconvenient to settle for each shipment. This is doubtless true; but every species of business involves inconvenience. In many cases, however, consignees depend upon the proceeds of the sale of goods to pay transportation charges thereon; it is here that the shoe pinches. They want the company to carry them, thus filling the dual office of carrier and banker. Where it is inconvenient to pay, or merchants have not sufficient storage, it is not unusual for them to ask permission to take such freight as they are most urgently in need of, leaving the balance as security, or until they can find room for it. This practice should not be permitted; it makes an unwarranted convenience of the carrier, and it is very doubtful, moreover, whether the property remaining in his hands could be held to secure payment of charges on the goods already delivered. The custom of

extending credit for transportation charges should not be encouraged. The carrier not only loses the use of the money he has earned, but he also loses the use of the advances made by him on the property, which latter amounts in the aggregate to a very large percentage of his gross earnings, and in many instances greatly exceeding it. He is, moreover, subjected to the annoyance of keeping an open account at stations where it is exceedingly inconvenient, and, what is quite important, subjects himself to the risk of loss in the event his patrons are unable or refuse to pay. Every transportation company complains of the burdens that the practice of extending credit entails, but they act hesitatingly or not at all in applying the necessary remedies, lest their rivals should take advantage of any movement they make, to prejudice the public against them. Thus the perpetuation of the practice is based on the mistrust that carriers entertain for each other. It is the duty, and a very important one, of traveling auditors and others, to ameliorate these conditions whenever possible, not only by individual effort with the agents, but by intercourse and co-operative effort with the officers and agents of other companies.

Questions to be Considered in Determining whether Credit shall be Allowed Consignees.—The impulsive and over-zealous agent allows credit for the purpose of increasing the popularity of his company; the incompetent because of ignorance, indolence or indifference; the unfaithful for personal reasons; the trustworthy to meet actual requirements of business. Whatever the reason may be, the public acquiesce in it, not that they are always benefited by the concession, for they are not, but the mere fact of its being granted affords gratification. If there is one thing more noticeable than another in the dealings of corporations with the public, it is the desire of individuals to secure some concession, privilege or favor not generally extended to their fellows. They seem to feel that its procurement is necessary to demonstrate their status and superior capability. The combative man is averse to every regulation, however proper or necessary, simply because it is a regulation, and its existence irritates him as the sight of a red cloth irritates a vicious bull. It is essential, therefore, in attempting to express an opinion in connection with the collection of freight charges at a station, that all the conditions incident to the delivery of freight should be properly understood and considered. And in giving instructions in connection with this important incident of the service, the necessities of business and the effect upon the company are alone to be considered. If the company is benefited by allowing credit, well and good; if otherwise, the practice should not be permitted. There cannot be any negative ground; either the company is benefited or it is not. The fact that credit is allowed increases its risks and deprives it temporarily of the use of its funds. These conditions in themselves are sufficient to prevent the practice where there are not good reasons for its prevalence. As a rule it is a good plan, and one generally observed, that credit shall not be extended at any station without consultation with the proper officer; but as the conditions of business are always changing, it is not possible for him to decide a question of this kind, except for the moment; hence the general principles governing the question should be well understood, and should be rigidly enforced. Wherever any doubt exists as to the propriety of delivering freight without the collection of charges, a special report of the same should be made by the Traveling Auditor to the proper officer, so that he may examine into the merits of the case, and either countenance or discountenance it.

When the Credit System is Proper and Unavoidable.—It usually happens where freight is delivered without collection of charges that it is done to meet the action of competing lines. In other cases the peculiar nature of a business and its isolation from trade centres or from the railway station makes it exceedingly inconvenient, if not impossible, to provide funds for the settlement of accounts upon the delivery of goods. In such cases the credit system (if it may be called so under such circumstances) is right and proper where the patron affords the necessary guarantee that he will pay when called upon at the end of a week or the time agreed upon. As a rule, credit should not be extended for a longer period than one week unless there are exceptional reasons therefor. If there is no necessity for extending credit, or if the practice arises through favoritism, or in consequence of over-zeal, ignorance, indifference, indolence or lack of good faith upon the part of the agent, the facts should be reported to the proper officer. The risk and inconvenience attending the credit system make it desirable to restrict it within the narrowest possible limits, and where a good and substantial reason does not justify the practice, it should be at once discontinued. Where the practice in this respect has been authorized by the proper officer, it should not be disturbed, but where the sanction of such officer is not of recent occurrence, and its further observance seems questionable, the matter should be called to the attention of the official in question for his further consideration. Where there is grave difference of opinion as to the necessity of allowing credit, the matter should be referred to the proper officer for his decision. In all other cases agents should be prohibited from delivering freight without the collection of charges when it is not considered necessary or the interests of the company are not advanced thereby.

Credit must not be Extended beyond the Time originally agreed upon.—If the conditions of business require that freight shall be delivered without the collection of charges, diligence must be exercised in collecting at the time agreed upon for the payment of the same, and in extending credit proper discretion must be made between

those whose wealth and standing in the community afford reasonable guarantee of their ability to meet their obligations, and those whose condition does not fulfill these requirements. Credit should never, under any circumstances, be extended to unfit persons, and in the event disaster should threaten or overtake those to whom it has been granted, instant and effective measures must be taken to secure the debt. When a carrier decides to extend credit to his patrons under any circumstances, the favor, like all favors coming from such a source, soon ceases to be regarded as a privilege, and is quickly looked upon as an inalienable right; hence a patron that is allowed a week or a month in which to pay his bills would be quite likely at the end of the specified time to ask, as a favor, for further credit; the original concession he assumes he was entitled to. Hence the extending of credit in the first instance does not guarantee or especially facilitate the prompt payment of balances at the expiration of the time agreed upon. However, additional time should never, under any circumstances, be allowed, no matter what the conditions may be or what the customs of competing roads are. The line must be drawn somewhere, otherwise the credit system would soon paralyze the operations of carriers; the proper place to draw this line is at the point where it was originally agreed that settlement should be made.

Consignees Must be Visited by Examiners when Freight has been Delivered without Collecting Charges—Collusion between Parties.—When it is found that freight is delivered without the payment of charges, the Traveling Auditor should personally visit consignees and compare the amounts claimed by the agent as unpaid with the consignees' books. The items must be verified in detail, as in no other way can the account be properly authenticated. The consignee may think that he owes the amount claimed, but it is only by comparing it, item by item, that his assertion can be accepted unqualifiedly. If there is any reason to suppose that the amount claimed to be due on uncollected freight is fictitious, the examiner should visit the consignees alone; otherwise he should be accompanied by the agent. Cases have occurred where there has been a tacit understanding between the patron and the agent that the former was to accept, and if necessary make good any amount that the agent might claim to be due from him, pending the examination of his accounts, the sum thus collected being refunded afterward by the agent from the receipts of the station. Such cases are, however, not common, but their occurrence teaches the necessity of caution and thoroughness in investigating uncollected freight balances. The greatest tact, however, must be observed not to compromise the character or standing of the agent in the community. It is not only important that he should have the confidence of the company, but that the public should believe that he possesses it, and there is nothing in these periodical examinations that need disturb this belief, if discretion is displayed by the examiner.

Where there are outstanding balances due the agency, it is advisable that they should be collected at the time of the examination by the agent acting jointly with the examiner. In the event there is anything wrong, this would be more likely to elicit the fact than the simple acknowledgment of the supposed debtor that he owed the amount claimed. If there should be good reason to suppose that there exists a conspiracy between the consignee and the agent by which the former is temporarily to make good any amount claimed to be due from him by the latter, the agent should be relieved (temporarily). If there exists any collusion, the belief that the agent has been removed will have the effect to elicit the fact, as the consignee will hardly care to take the chances of being able to collect back the money from a person out of employment and no longer able to accommodate him in return. Where arrangements of this kind exist between agents and consignees, the latter do not usually suppose that they are protecting the agent in any criminal act. It is represented to them that it is an accommodation simply, to relieve the agent from the necessity of a long and tedious examination, and it is on this ground that their friends consent to advance them, temporarily, the sum they need.

London International Inventions Exhibition.

It is intended to hold, in the year 1885, an International Exhibition of Inventions and Musical Instruments in the Exhibition Buildings, Royal Horticultural Gardens, South Kensington, London. The Division of Inventions will be devoted to apparatus, appliances, processes, and products invented or brought into use since 1862. The collection of inventions will, it is hoped, serve to bring vividly before the public the progress which has been made during the last quarter of a century in applying the discoveries of science to the purposes of daily life. For the practical realization of this idea, it will be desirable not only to exhibit the apparatus by which a process is carried out—or a model or diagram of it—side by side with the resulting product, but also to show the working of, at all events, a limited number of industrial processes in their consecutive stages. It will, indeed, be preferable that inventions generally should, as far as practicable, be illustrated by models, which in the case of an entire machine may be accompanied by actual examples of the parts improved. Where the invention relates to parts only of a machine, the whole machine will not be admitted unless the improvement—in respect of which the machine is offered for exhibition—cannot be sufficiently well shown without the exhibition of the entire apparatus, or unless in the opinion of the Executive Council the exhibit is of such special interest as to render its admission desirable. Exhibitors will be required by reference to a specification and letters patent or otherwise, to show that their proposed exhibits come within the scope of the Exhibition.

As the Exhibition will be limited to the illustration of industrial processes, examples of either the raw material employed, or the finished product, will only be admitted when they are required for the full demonstration of a particular process. It is not proposed to allot space for the exhibition

of manufactured goods alone, unaccompanied by any illustrations of the process of manufacture.

Applications for foreign countries and the colonies will be received up to Nov. 1.

The Exhibition will be open to the following appliances used in connection with railroad construction and working:

Group II.—Mining and Metallurgy.

Class 9. Production and Manufacture of Iron and Steel:—Coke ovens, blast and other furnaces; Bessemer plant, Siemens plant, other processes for making iron and steel; blast engines; hot blast stoves; steam and other hammers; rolling machines, hydraulic and other forging machines, squeezers and other shingling apparatus; production and use of malleable cast iron; alloys and artificial compounds of iron with non-metallic elements.

Class 10. Forging and Foundry Work: Cupolas, air furnaces, pot furnaces; molding machines, plate molding; forges, forging machines; blowers, bellows, fans.

Class 11. Metallurgy of Metals other than Iron, with the exception of the precious metals. Alloys—Manufacture of copper and brass tubes; bronzes, German silver and other nickel alloys.

Group III.—Engineering Construction and Architecture.

Class 14. Railways and Tramways: Construction; excavators and appliances used for earthwork and tunneling. Permanent way: rails, chairs, sleepers.

Class 15. Bridges and Viaducts: Models, plans and designs for arched, girder, suspension, trestle and other bridges; apparatus used in construction.

Class 23. Materials used in Building: Bricks and tiles, machines for making them; concrete, artificial stone, cement, materials and appliances used in their production; asphalt; roofing felt, and other roofing materials; columns, girders and other applications of metal in building; applications of terra-cotta to buildings; preservative and fire-resisting materials, paints, etc., for application to stone, wood, iron, etc.; methods of applying the same.

Class 24. Building Construction: Models and plans showing methods of construction; non-combustible constructions; labor-saving and other machines and appliances used in building scaffolds, elevators; fittings and appliances used in buildings, shutters, blinds, lifts, bells, speaking tubes, etc.

Class 25. Heating, Ventilation, House Drainage, etc.: Sanitary appliances; ventilators; cowls for chimneys; chimney-sweeping apparatus; apparatus for heating by steam, water, air, etc.; means of cooling air.

Group IV.—Prime Movers, and means of Distributing their Power.—(For distribution of power by water, see also Group xi.; by electricity, see Group xlii.)

Class 26. Steam Engines and Boilers: Stationary, portable, marine, locomotive; fireless locomotives; methods and means of preventing corrosion and incrustation; methods and appliances for preventing explosions and for testing boilers; firebrakes, fire-feeders, smoke-consuming appliances; valves and valve gear; steam joints, governors, injectors, pumps; bearings, lubricators, anti-friction metals; indicators, gauges, manometers, tachometers, dynamometers.

Class 29. Means of Transmitting Power: Driving bands, shafts, pulleys, gearing, clutches, distribution of power by water or by air.

Group V.—Railway Plant: (For construction of railways and tramways, see Group iii.; for locomotives, see Group iv.; for signals, see also Group xlii.)

Class 30. Rolling Stock (excepting Locomotives): Carriages, trucks, wagons, vans; wheels, tires, axles, springs, bearings, buffers, couplings.

Class 31. Fixed and other Appliances: Switches, signals, crossings, turntable, switch locks, communication with trains and in trains, water cranes and other modes of tender supply.

Class 32. Brakes, Hand and Automatic: Screw, chain, compressed air, vacuum, steam, electrical.

Class 33. Tramways: Rolling and fixed plant.

Class 34. Atmospheric Railways, Portable Railways, etc.: Rope railways, pneumatic dispatch.

Group X.—Machine Tools and Machinery.—(For steam hammers and forging machinery used in iron and steel making, see Group ii.)

Class 35. Metal-working Machines: Lathes; planers; machines for punching, shearing, sawing, drilling, boring, slotting, shaping, milling, wheel-cutting, screw-cutting, rolling and bending, corrugating, stamping, coining, pressing, riveting, forging; emery wheels, grinding machines; rivet, nail, bolt, and screw-making machinery.

Class 57. Wood-working Machinery: Lathes (including lathes for ornamental turning); machines for sawing, planing, molding, mortising, carving, veneering, wheel-making, etc.

Class 58. Stone-working Machinery: Machines for sawing, planing, turning, dressing, polishing, grinding, breaking and crushing stone and slate.

Group XI.—Hydraulic Machines, Presses, Machines for Raising Heavy Weights, Weighing, etc.—(For elevators used in building, see Group iii.; for hydraulic rams, see Group iv.; for grain elevators, see Group xvii.)

Class 59. Pumps, Hand, Steam, Rotary, Centrifugal: Hydropneumatics; methods of raising water; methods of obtaining, distributing, and equalizing hydraulic power; accumulators.

Class 60. Fire Engines: Fire-extinguishing apparatus; automatic apparatus for indicating and extinguishing fires; fire-escapes, ladders, fire-hose, accessory fittings and appliances; hydrants.

Class 61. Cranes and other Lifting Apparatus: Hand, steam, and hydraulic cranes; travelers; elevators, jacks, capstans, windlasses, crabs, hoists, blocks, pulleys, derricks.

Class 62. Hydraulic and other Presses.

Class 63. Weighing Machines (for commercial purposes): Steel-yards; platform weighing machines; commercial balances, scales, weights, etc.; registering weighing machines; spring balances.

Group XII.—Elements of Machines.

Class 64.—Mechanical Movements.

Class 65. Separate Parts of Machines.

Group XIII.—Electricity.—(For railway signals, see Group v.; for scientific apparatus used in electrical research, see Group xviii.)

Class 66. Generators: Dynamos, primary and secondary batteries, thermo-electric batteries.

Class 67. Conductors: Submarine cables and apparatus for laying them; aerial wires and underground cables; insulators and poles, insulating and coating materials; joints and connections; underground conduits; pipes, tubes, troughs, etc., electric-light leads.

Class 68. Testing and Measuring Apparatus: Galvanometers, magnetometers, dynamometers, volt-meters, current-meters, methods of testing.

Class 69. Telegraph and Telephonic Apparatus: Needle instruments, A B C instruments, Morse instruments, type-printers, relays, duplex and quadruplex apparatus, keys, recording instruments, automatic transmitters, electric bells, indicators, telephones, microphones, lightning protectors.

Class 70. Electric Lighting Apparatus: Lamps, resistance coils, cut-outs, safety catches, switches. Fittings for glow and other lamps.

Class 71. Electro-metallurgy and Electro-chemistry: Methods of depositing and coating various metals. Electro-typing, galvanoplasty. Vats, cleaning and polishing apparatus, materials, tools and appliances.

Class 72. Distribution and Utilization of Power: Electric railways, electric motors, electrically driven boats, tricycles and other conveyances; systems of distribution.

Class 73. Electric Signalling: Fire and burglar alarms, railway and time signals, water level indicators, tell-tales, electric clocks, chronoscopes, etc.

Class 74. Lightning Conductors.

Class 75. Electro-Medical Apparatus.

Group XV.—Gas and other Illuminants.—(For electric lighting, see Group xlii.)

Class 81. Coal Gas:—Manufacture, purification, storage, and distribution of gas; treatment of residues.

Class 82. Water Gas, Oil Gas, Carbureting Air, etc.,

Class 83. Tests and Photometrical Apparatus:—Chemical tests; standards of lights; measurement of light.

Class 84. Burners, and Means of Utilizing and Applying Gas:—Gas fittings; burners for illuminating gas; devices for imparting luminosity to flame; gas meters; methods of lighting gas; methods of increasing illuminating power of gas.

Class 87. Lamps for Oil and Spirits.

Group XVI.—Fuel, Furnaces, etc.

Class 88. Manufacture of Fuel:—Materials and processes for the manufacture of artificial fuel; preparation and use of liquid fuel; preparation of peat; charcoal burning.

Class 89. Furnaces for Manufacturing Purposes:—Furnaces for burning solid, pulverized, liquid and gaseous fuel.

Class 90. Stoves for Coal, for Gas, for Oil, etc.:—Cooking stoves and kitchen ranges; domestic fireplaces; gas cookers; gas burners for heating and cooking; petroleum and other stoves for heating and cooking.

Group XVII.—Food, Cookery and Stimulants.

Class 91. Machinery for Treating Grain and Flour:—Grain elevators.

Group XXII.—Furniture and Accessories.

Class 112. Furniture and Upholstery: Articles of furniture; machinery and processes used in their production.

Class 114. Artistic and Ornamental Metal Work: Electro-plate; ornamental bronzes; appliances used in the manufacture.

Class 117. Brushes: Materials, machines, and appliances used in the manufacture; methods of brush-making.

Group XXIV.—Cutlery, Ironmongery, etc.

Class 124. Cutlery and Tools: Engineers', carpenters', joiners', etc., tools.

Class 126. Files and Rasps: File-cutting machines.

Class 127. Hardware: Hollow-ware; ornamental castings; locks and bolts.

Class 128. Screws, Nails, etc.:—Spikes, hinges; furniture fittings.

Group XXVII.—Clocks, Watches and other Timekeepers.

Class 144. Clocks:—Timepieces and regulators and watchman's calendar, turret, electrical and pneumatic clocks.

Class 145. Time Signals, etc.:—Methods of controlling and synchronizing clocks; apparatus for the distribution and signaling of time.

Class 146. Watches and Chronometers:—Keyless, chronograph, repeating and other forms of watches.

Group XXVIII.—Philosophical Instruments and Apparatus.

Class 151. Electrical:—Friction and induction machines, batteries and other sources of electricity, Leyden jars, condensers, electroscopes, electro-meters, galvanometers, voltmeters, dynamometers, magnetometers, rheostats, resistances, electrical units, induction coils, thermopiles, vacuum tubes.

Class 152. Chemical:—Thermometers, hydrometers, pyrometers, furnaces, blow-pipe apparatus, assaying apparatus, apparatus for organic and inorganic analysis, for gas analysis, and for volumetric analysis, laboratory fittings and apparatus generally, balances, reagents.

Class 153. Mathematical:—Calculating machines, indicating and registering apparatus, counting machines, slide rules, planimeters, drawing instruments, ellipsographs, straight-edges, gauges, surface planes, dividing engines, pantographs, eidographs.

Class 153. Geographical:—Surveying apparatus, theodolites, chains levels, projections, maps, charts.

Class 157. Weighing and Measuring:—Weights, scales, balances; measures of length, graduated scales, verniers, steel tapes.

TECHNICAL.

Locomotive Building.

The Baldwin Locomotive Works in Philadelphia have just completed an order of 10 freight engines to go to New South Wales. An order for 14 heavy freight engines for the Missouri Pacific Railroad is just being finished.

Car Notes.

The Jackson & Woodin Manufacturing Co., in Berwick, Pa., has just closed a contract to build 200 freight cars for the Delaware, Lackawanna & Western road.

The Ohio Falls Car Co., in Jeffersonville, Ind., have completed a number of light passenger cars for the Jeffersonville, Madison & Indianapolis road. They are to be run on the local trains between New Albany and Louisville.

Blaine Bros., in Huntingdon, Pa., have secured a contract for building 400 box-cars for the Florida Railway & Navigation Co. The iron-work, trucks, etc., will be made at Huntingdon, but the wood-work of the cars will all be done at Ellaville, Fla., on the line of the company's road.

Bridge Notes.

The Morse Bridge Co., in Youngstown, O., has taken a contract for a new highway bridge over the Conemaugh River, near Blairsville, Pa. The bridge is to be completed by December.

The Keystone Bridge Co., in Pittsburgh, has taken a contract for the erection of several buildings at the New Orleans Exposition.

The Peninsula Bridge Co., at Detroit, has been incorporated, with a capital of \$100,000.

The contract for the Metropolitan avenue bridge in Brooklyn has been let to Mr. A. F. Boller, the well-known engineer and bridge-builder.

Iron Notes.

The Crane Iron Co., Catasauqua, Pa., has announced a reduction of ten per cent. in the wages of all employees, to take effect Sept. 1.

The Heimbacher Forge & Rolling Mill Co., in St. Louis, has now four hammers at work and reports trade somewhat improved.

The sale of the Steubenville Furnace at Steubenville, O., has been set aside on the payment of the judgment obtained by J. G. Johnston, one of the bondholders of the old Steubenville Furnace & Iron Co.

The Cleveland Rolling Mill Co.'s Bessemer steel works roll

and blooming mills suspended operation August 25, until further notice. The new blooming mill is still running.

The rolling mill of the Reeves Iron Co., at Canal Dover, O., is running full double turn.

It is reported that the Forest City Rolling Mill in Cleveland, O., is to be sold to Pittsburgh parties.

The St. Louis Steam Forge, A. McDonald & Bro., proprietors, is running double turn with nearly all the hammers employed.

Manufacturing Notes.

Poole & Hunt, whose works are at Woodberry, near Baltimore, have secured the contract for furnishing all the machinery for the cable railroad now under construction in Hoboken, N. J. The cable plant will be one of the heaviest in the United States. This firm has just completed a lot of machinery for a cable railroad in Kansas City.

The Hercules Iron Works, in Chicago, recently completed a heavy hammer for the steam forge of M. J. Smith in Chicago and are building a second hammer of large size.

The Hazard Manufacturing Co., in Wilkes Barre, Pa., has just completed a wire cable over six miles long for the Third Avenue Street Railroad in New York.

The Westinghouse Air Brake Works in Pittsburgh commenced to run half time Sept. 1. It is not expected that this will continue very long.

Mr. Theodore Thurber, of Auburn, N. Y., the inventor of a steel-plate car wheel, is now negotiating for the establishment of a factory in Buffalo where his wheels can be manufactured. One set of Mr. Thurber's wheels has been running for some months on a passenger car on the Lake Shore road with satisfactory results. The wheel has a steel tire, the body being formed by two steel plates which are fastened to the tire and also to the solid hub.

To Remove Foreign Bodies from the Eye.

Before resorting to any metallic instrument for this purpose, Dr. C. D. Agnew—*American Practitioner*—would advise you to use an instrument made in the following manner: Take a splinter of soft wood, pine or cedar, and whittle it into the shape of a probe, making it about the length of an ordinary dressing probe. Then take a small, loose flock of cotton, and, laying it upon your finger, place the pointed end of the stick in the centre of it. Then turn the flock of cotton over the end of the stick, winding it round and round, so as to make it adhere firmly. If you will look at the end of such a probe with a 2-in. lens you will see that it is quite rough, the fibres of cotton making a file-like extremity, in the midst of which are little interstices. As the material is soft, it will do no harm to the cornea when brushed over its surface. When ready to remove the foreign body, have the patient rest his head against your chest, draw the upper lid up with the forefinger of your left hand, and press the lower lid down with the middle finger, and then delicately sweep the surface in which the foreign body is embedded, with the end of the cotton probe. When the foreign body is lodged in the centre of the cornea, it is most important not to break up the external elastic lamina; for if you do, opacity may follow, and the slightest opacity in the centre of the cornea will cause a serious diminution in the sharpness of vision.

The Education of Mechanical Engineers.

This subject is being vigorously discussed in England. To a great extent mechanical engineers are born, not made, and unless a boy has a mechanical bent, no amount of scientific training will make him capable of designing first-class machinery. This faculty certainly seems inherent in the Anglo-Saxon race, and is not found so generally developed elsewhere. A correspondent writes to the *London Engineer*:

"We often hear it said that the foreigner is beating us because of his science, and we are told of the splendid schools on the Continent where all the 'ologies' and a great deal beside is taught. In the matter of mechanical engineering, however, these schools have done just nothing. The scientific training of the German and French mechanical engineers does not enable either the one or the other to turn out decent machinery. There is not to be found on a single railway in France or Germany a locomotive which pleases English eyes, or the construction of which can be defended on any sound mechanical basis, unless it has been designed by an Englishman or a Scotchman. Mr. John Haswell did more to provide Austria with really good locomotives than any other man living. Take the average stationary engine of France, and compare it with ours. Scientific training will not teach a man how to build a good steam engine, or a good lathe, or any other machine. The men to whom England owes all her greatness were not scientific at all. The best mechanical engineers of the day—the Maudslays, the Penns, the Stephenson's *et hoc genus omne*—were not in any sense or way men of science, and not one of them went through the training now supposed to be essential to the young engineer.

A Large Lake Vessel.

The new steam barge "Australasia," said to be the largest wooden vessel on the lakes, was launched Sept. 2 from Davidson's shipyard at Bay City, Mich. The "Australasia" is a double decker, with seven hatchways. Her dimensions are: Extreme length, 305 ft.; length of keel, 285 ft.; breadth of beam, 40 ft.; depth of hold, 23 ft.; depth of lower hold, 12 ft.; and distance between decks, 10 ft. Two iron belts 10 in. wide and $\frac{1}{2}$ in. thick completely encompass the frame work on the inside and outside near the upper deck. Similar iron straps run diagonally down the vessel's sides, bracing the frame work. The engine is a fore and aft compound, the high pressure cylinder of 30-in. bore and 45-in. stroke. This is said to be the largest engine on the lakes. There are two boilers, each 27 ft. long. The shaft is 11-in. in diameter and carries a 12 $\frac{1}{2}$ ft. wheel. It is estimated that the vessel will carry 2,000,000 feet of lumber, or 100,000 bushels of wheat.

A New Railroad in Cuba.

The railroad of the Juragua Iron Co. in Cuba was recently completed and was formally opened for traffic with a banquet and other celebrations. The railroad, which is chiefly owned by parties interested in the iron manufacture in this country, extends from the Juragua mines via Juraguacito and Aguadores to Santiago de Cuba. It is 17.5 miles long, running generally through a very rough, hilly and broken country and requiring some extensive work. In order to avoid as much heavy work as possible the railroad is extremely crooked, having in its entire length 7 miles of curves and only 10.5 miles of tangents. Some of the curves are of as small a radius as 380 ft., that being the minimum radius of curvature adopted. The maximum grade is 150 ft. to the mile. The road is intended to carry the ore from the Juragua mines to the port of Santiago. A temporary wooden pier for loading the ore in vessels has already been built, and a permanent iron pier is now under construction. A number of small bridges crossing the mountain streams are required on the line, but the only important bridge is over the San Juan River, where an iron bridge has been built with one span of 200 ft. and several shorter spans. This bridge, with the iron viaduct approach, was built by Kellogg & Maurice, of Athens, Pa., and is supported on iron pil-

ars resting upon a foundation of creosoted piles. The smaller bridges are generally of wood, but none are of large size, although many are placed at considerable heights above the stream which they cross. Mr. G. B. Lindermann, of Bethlehem, Pa., is President of the company; Mr. Thomas M. Graham is Superintendent, and Mr. M. King, Chief Engineer of the road.

California Iron.

From an interview with Irving M. Scott, of the Union Iron Works, in the *San Francisco Chronicle*, we make the following extracts, which impart some information concerning the iron interests of California:

The furnace plant at Hotelling, Placer County, has a capacity of about 30 tons a day. The fuel used is charcoal, of which there are consumed about 100 bushels to the ton. With other expenses of manufacture, it costs there about \$18 per ton. The selling price of pig iron is about \$25. The freight to San Francisco is \$2.75 per ton, which, added to \$18, the cost, makes \$20.75. There are 177 men employed, and they distribute in the county of Placer about \$12,000 a month. There are great numbers of iron-ore deposits in the state. There is splendid iron ore found in Sierra Valley, in Shasta, near Napa, in the neighborhood of Sonoma, not far from Los Angeles, in San Bernardino County, and elsewhere in the state. There are also great deposits in Oregon and Washington. There is plenty of ore everywhere, but, unfortunately, a lack of fuel. The iron interests of California have much to prevent their rapid development, and need all possible encouragement.

At present not one pound of boiler-iron plate suitable for ship work is made on this coast; but the California Iron & Steel Co. is putting up a bloomery for the purpose of manufacturing plates or making the blooms out of which plates are rolled.

Soldering Aluminium.

The use of aluminium in the arts has been much restricted by our ignorance of any method of soldering it, either to itself or other metals. Now, however, a French engineer, M. Bourbouze, has discovered a way of soldering it. The process consists in plating both surfaces to be soldered, not with pure tin, but alloys of tin and zinc, or, what is better, tin, bismuth and aluminium, etc. Good results are obtained with all such alloys, but those containing tin and aluminium are best. They should contain different proportions, according to the work the soldered parts have to do. For parts to be fashioned after soldering, the alloy should be composed of 45 parts of tin and 10 of aluminium, as it is sufficiently malleable to resist the hammer. Pieces thus united can also be turned. Parts which have not to be worked after being soldered may be united with a soft solder of tin containing less aluminium. This last solder can be applied with a hot soldering iron, as in soldering white iron, or even with a flame. Neither of these solders requires any prior preparation of the pieces to be soldered. It suffices to apply the solder, and extend it by help of the iron over the parts to be joined. When, however, it is desired to solder certain metals with aluminium, it is best to plate the part of the metals to be soldered with pure tin. It is sufficient then to apply to the part the aluminium plated with alloy, and to finish the operation in the usual manner. —*Iron Age*.

Petroleum an Anti-Incrustator.

At the recent meeting of the Institute of Mechanical Engineers, at Cardiff, several speakers gave their experience on this point.

Mr. P. F. Nursey observed that the introduction of petroleum into steam boilers for the purpose of preventing priming had been patented by a Danish engineer, and had been successfully used on a sea-going steamer. The boilers of the vessel primed so badly that it was proposed to take them out; but by the employment of the petroleum this fault was cured. The petroleum was injected with the feed, a small quantity being put in at the commencement, and again about the middle, of each trip. It was found that not only did this use of petroleum prevent priming, but also that it did away with hard incrustation in the boiler, and rendered unnecessary any lubrication in the engine cylinders.

Mr. Cardew, of the Indian State Railways, next spoke as to the use of petroleum as a disinfectant in locomotive boilers. His road had exceptionally bad water, containing a large proportion of sulphates; so much so that the boilers had to be washed out after every 100 miles run. With a view of obtaining the deposition of the solids in the form of dust, the introduction of Rangoon oil had been tried, but at first the result was to cause excessive priming and to produce leaky tubes, etc., so much so that when an engine using it went out they never quite knew when it would get back again. Eventually, however, they found that by using very minute quantities of the oil they got the desired result without these inconveniences, and the practice ultimately arrived at was simply to paint the interior of the tender tank with kerosene each time the boiler was washed out. The application of kerosene as an anti-incrustator had been made on several Indian railways, but he believed that on some it had been given up as being too ticklish to manage.

Mr. Druitt Halpin observed that he had for years successfully used petroleum as an anti-incrustator in boilers supplied with worse water than that found in the Punjab (with the character of which he was acquainted). The boilers in which he had used it were of the Lancashire type, 7 ft. in diameter by 30 ft. long, and from a pint to one and a half pints of petroleum were used per boiler per week, the petroleum being put in the boilers through the safety-valves on Monday mornings. —*Engineering*.

Petroleum Fuel for Locomotives.

Mr. Thomas Urquhart, Locomotive Superintendent of the Grazi & Tsaritzin Railroad, South Russia, read a paper on this subject before the Institute of Mechanical Engineers, at their meeting at Cardiff. The author stated that he had made his first experiments in 1874, and has now 72 locomotives burning liquid fuel. Naphtha refuse has a theoretical evaporative power of 16.2 lbs. of water, and anthracite of 12.2 lbs. at 120 lbs. pressure per square inch; hence, petroleum has, weight for weight, 33 per cent. higher evaporative value than anthracite. In locomotive practice a mean evaporation of 7 lbs. to 7 $\frac{1}{2}$ lbs. of water per pound of anthracite is generally obtained, thus showing 60 per cent. of efficiency. But with petroleum, the author said, an evaporation of 12.25 lbs. is practically obtained, giving 75 per cent. efficiency, and hence the practical evaporative value of petroleum must be taken at 63 to 75 per cent. higher than that of anthracite.

A peculiar form of spray injector had been found to give the best results. The combustion chamber is constructed with fire-brick inside it, which, when heated, acts as a regenerator, retaining the ignited gases long enough to secure their thorough admixture with air. In certain instances the incoming air at the forward ash-pan damper was heated by passing through a narrow channel in the brick-work. All the locomotive sprays were worked with steam, but in a fire-heating furnace the author uses an air blast from a Root blower. In this the cost of fuel is only one-third of what it was with bituminous coal, and the work done per day has increased 25 per cent. Four spray nozzles are ar-

ranged tangentially to the tire, and there is a circulation of flame all round.

To get up steam in a petroleum-fed locomotive, it is temporarily connected to a switching-engine or stationary boiler, to obtain steam for the blower and the spray jet. Steam can be raised to 45 lbs. in 20 minutes, and to 120 lbs. in 55 minutes. If the water be already hot, the full pressure is obtained in 25 minutes. In lighting up, the spray nozzle is first cleared of water by the steam jet, and at the same time the blower in the chimney is started for a few seconds, to draw the gas, if any, out of the smoke-box. A piece of cotton waste, or a handful of lighted shavings, is put in the combustion chamber, and the spray turned on; the oil immediately ignites without an explosion, and then its quantity can be augmented at pleasure. When the fuel is turned off, as in descending a long incline, the ashpan doors are closed, and also the revolving air-damper in the chimney, to retain the heat. When the fuel is turned on again, the box is hot enough to light it.

Main storage reservoirs, each holding 2,050 gross tons, are situated about 100 miles apart along the line, and distributing reservoirs with gauge glass and scale are provided at every round-house.

The consumption in summer is 32.08 lbs. per train mile and in winter 39.15 lbs., with freight trains of 25 loaded cars. In comparison with anthracite, the saving in favor of petroleum was 55 per cent. in cost, and 41 per cent. in weight. With bituminous coal there was a difference of 49 per cent. as to weight, and 61 per cent. as to cost. The cost of the petroleum averaged \$4.98 per ton, and the coal (anthracite and bituminous) \$6.44 per ton. No trouble had been experienced from explosions, even in collisions.

In the discussion which followed, several speakers stated that longer tubes were necessary with liquid fuel, and that no smoke was produced after the fire-brick arch was once hot.

The petroleum is produced on the shores of the Caspian Sea, and is extensively used by steamers navigating that huge salt lake. In 1876 a Russian engineer came to this country to investigate experiments with petroleum as fuel for locomotives which had been made here. He said that at that time, though it was used successfully on steamers, it had failed on locomotives.

Photographing a Coal Mine.

The first attempt ever made to photograph the interior of a coal mine was successfully carried out on the 28th ult., at Robinson Colliery, of the Philadelphia & Reading Co., at Shenandoah, Pa. The breast photographed is 40 ft. wide by 60 ft. high. The photographer was G. M. Bretz, of Pottsville. The working was illuminated by the Arno electric light. Eight exposures were made, occupying from 10 to 30 minutes each and resulting in five perfect negatives, showing not only the formation of the coal measures, but also the practical operation of cutting coal and loading cars. The views are intended to constitute a portion of the United States government exhibit at the coming New Orleans exposition. —*Coal Trade Journal*.

THE SCRAP HEAP.

Wives of Broken Necked Husbands.

The *New York Herald* says: "The contractors, Rushling & Ford, who stretched a wire guy rope across West Sixty-ninth street, which Anton Guterman drove against, breaking his neck, are not well pleased with a verdict rendered yesterday by a Coroner's jury, on the strength of which Guterman's wife will sue for heavy damages."

A man with a broken neck, who, after being sat upon by a coroner's jury, is still alive enough to have a wife, certainly deserves some public recognition. If there are any other men of this sort, hiding in obscurity, let them step forward; they would be invaluable for coupling cars, and could most appropriately fill many posts upon a railroad. Their sphere of usefulness would, however, be limited should the wife invariably sue for heavy damages. Possibly this is an exceptional case. It is fortunate that Mr. Anton Guterman didn't drive against a locomotive instead of choosing an insignificant wire rope.

He would doubtless have behaved in the same way and his wife would have sued the railroad company for exemplary damages. The result of this unique case upon the youth of the country opens a wide field of conjecture, but will probably be most demoralizing. We already know, on good authority, that every young man in this country wishes to become a fireman, and possibly the living proof that a man can survive a broken neck, and a coroner's verdict, might induce all the young men to change their minds, and wish to contract hasty and imprudent marriages, recklessly drive buggies against express trains, and bring actions in their wives' names against the companies, and live idle and useless lives happily forever after on the money thus easily acquired.

We are not surprised that the contractors feel hurt at the unreasonable conduct of the wife, who is not content with a live husband with a broken neck, but must needs want heavy damages into the bargain. What injury has she sustained? She has lost her husband, that is evident from what the *Herald* says, and as he survives, he is evidently a hardy sort of man, not liable to be affected by trifles.

The affair is another proof of the inventive spirit of this progressive age, and we can only wonder if the *Herald* can "forecast" whether this sort of thing is to become common.

Car Windows.

President Arthur, on his return from the Catskills recently, was asked by a reporter to give his views as to "the outlook for the country" as observed on his trip:

"Oh, yes," was the reply, "you may report me as saying that the outlook is bad, very bad. I have done my riding in parlor cars, where invariably the lower part of the sash, when the window is up, runs right across the level of my eyes, shutting off a good strip of the view. Please print that. Ask why it is that, if the intention is to exclude dust by keeping the windows half down, they don't make the under side of the sash merely a thin strip of metal, instead of a wide piece of wood. Why, a passenger is about like a cow with a blinding board across her face."

I commend the President's criticism to railroad managers, with my indorsement. I do not believe there is any deliberate intention to torture travelers; nor am I hard to please, as are some passengers whom I encounter. —*Correspondence of St. Louis Republican*.

How Doth the Little Busy Bee.

A party of Lake Bluff residents boarded the train to come into Chicago a few days ago. Between Lake Bluff and Lake Forest the cars ran over a swarm of wild bees which had come out of the trunk of an old tree standing in the pasture by the roadside. The bees, angered at the death of their queen and thousands of their comrades, rose suddenly, flew through the open windows into the coaches and proceeded to get even with the Northwestern road by attacking its passengers. The people were thrown into the wildest confusion. The little insects were swift in their work and spared nobody. It was useless to fight them, for every effort to drive them off made them all the more vicious and determined. Several of the good brothers and sisters were

badly stung. One pretty young lady was kissed on the left cheek by a little bee, and in a few seconds the beautiful contour of her face was ruined. A sleek-looking Methodist preacher came out of the fray with a big red nose, and one of the gossiping sisters was stung on the tongue. Before the train arrived at Lake Forest the bees had fled, leaving their victims with faces and hands swollen and burning with pain.—*Evening Telegram.*

"A Man Unacquainted with the Geography of This Country."

We can vouch for the historical accuracy of the following little modern society drama:

The scene opens and discloses the interior of the Metropolitan Hotel, New York.

Enter two citizens, and gaze at a pictorial poster of the Rock Island road.

First Citizen: Fine road that.

Second Citizen: Rock Island, eh? That's one of the roads out of Detroit, ain't it?

First Citizen: Why no, it's on the Mississippi.

Second Citizen: Oh, yes, of course; between Memphis and Little Rock.

Tablenu, Green Fire. Curtain.

Cranks.

A machine has been invented to prevent people walking on railroad tracks from being run over. It looks as if the pistol will soon be the only resource for suicidal cranks.—*Post.*

A gang of Italian laborers near Saratoga were recently cut down 10 cents a day. Instead of striking, they cut an inch off their shovel blades at night. The boss asked what it meant, and one of the men replied: "Not so much pay, not so much dirt lift; all right, job last the more long. Italian no fool like Irishman; he no strike."—*Baldwin's Guide.*

There are honest Germans in New York, who, when their countrymen land in Castle Garden on their way to the great West, tell them that the train does not stop anywhere before reaching Chicago, and then they sell each immigrant six yards of sausages, so that he may have something to eat on the long road.—*Louisville Courier Journal.*

ANNUAL REPORTS.

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Cleveland & Marietta.

This company owns a line from Marietta, O., to Canal Dover, 98 miles, with a branch of 1½ miles in Marietta, making 99½ miles in all.

The equipment consists of 11 engines; 10 passenger train cars, 459 freight cars and 3 service cars.

The capital stock is \$1,547,000; the funded debt consists of \$1,000,000 first-mortgage 7 per cent. bonds.

The road is controlled and operated in the interest of the Wheeling & Lake Erie Co.

The earnings for the year ending March 31 were as follows:

	1883-84.	1882-83.	Inc. or Dec.	P. c.
Earnings.....	\$224,763	\$197,497	I. \$27,266	15.9
Expenses.....	101,404	150,089	I. 41,393	27.6
Net earnings.....	\$37,399	\$47,398	D. \$10,099	21.4
Gross earn. per mile.....	2,299	1,985	I. 314	15.9
Net.....	375	475	D. 100	21.4
Per cent. of exps.....	83.60	70.01	I. 7.08	

Expenses were increased last year by heavy damage from floods. Payments outside of expenses were \$70,000 for interest and \$267,849 for new construction and improvements; a total of \$327,849, showing a deficit of \$290,550 for the year.

The report shows that since June 1, 1882, there has been expended on the road (less old rails sold) \$417,000 by Com. Garrison, besides \$39,000 interest and \$10,000 old indebtedness in excess of net earnings. Besides this 600 tons of steel rails have been ordered since March 31, 1884.

The Manager, M. D. Woodford, recommends an additional purchase of 900 tons steel rail, valued at \$25,000. That road around Liberty Hill or through tunnel be completed at a cost of \$85,000 that \$15,000 be expended in reducing

grades, \$21,000 on new bridge over Tuscarawas, \$10,000 for raising tracks, \$25,000 for new bridges over Duck Creek and Will's Creek, \$20,000 for filling trestles, \$8,000 for depots at Marietta and Caldwell, and for cars and locomotives, \$66,000, making in all \$275,000.

He also recommends the laying of steel rails from coal mines to Marietta, at an additional expenditure of \$150,000.

Pacific Mail Steamship Co.

This company owns a large number of steamships and runs lines between New York and Aspinwall; Panama and San Francisco; Panama and Central American and Mexican ports; San Francisco, Yokohama and Hong Kong; San Francisco, New Zealand and Australian ports. The report is for the year ending April 30.

The general account is as follows:

Stock.....	\$20,000,000
Due Panama R. R. Co.....	838,944
Sundry accounts and balances.....	348,875
Total.....	21,187,819
Cost of steamers.....	\$11,266,815
Real estate and improvements.....	1,079,513
Coal, supplies, etc.....	478,301
Sundry assets.....	1,286,981
Profit and loss.....	7,076,209
Total.....	\$21,187,819

The company has no funded debt. The chief liability is the amount due the Panama Railroad Co., which is payable in installments.

The earnings for the year were as follows:

	1883-84.	1882-83.	Inc. or Dec.	P. c.
Steamship lines.....	\$4,403,071	\$3,713,161	I. \$689,910	18.6
Subsides.....	291,136	282,280	I. 8,856	3.2
Miscellaneous.....	93,638	107,323	D. 13,685	12.8
Total.....	\$4,787,899	\$4,102,764	I. \$685,135	16.7
Expenses.....	3,394,419	3,190,507	I. 203,912	6.4
Total.....	\$1,393,480	\$912,257	I. \$481,223	52.8
Per cent. of exps.....	70.89	77.76	D. 6.87	

The subsidies received were: Central American and Mexican, \$105,500; Hawaiian, \$5,500; Australian and New Zealand, \$180,190; total, \$291,190.

Of the steamer earnings passengers furnished \$1,319,388, and freight \$3,083,683.

The earnings of the several steamship lines were as follows:

	Gross earn.	Expenses.	Net earn.
Atlantic.....	\$991,094	\$576,125	\$414,969
Panama.....	1,790,927	1,167,214	623,713
Trans-Pacific.....	1,251,762	635,479	616,283
Australian.....	369,288	408,346	-\$39,058
Total.....	\$4,403,071	\$2,787,144	\$1,615,927
Subsides received.....			291,190
Total net earnings of steamers.....			\$1,907,117

*Deficit.

The deficit on the Australian line was more than made up by the subsidy (\$180,190) received.

The report of Mr. J. B. Houston, President, says: "I submit hereto annexed the statement of your business for the past year, and hope that the same may be considered satisfactory, as it shows the net earnings to have been seven per cent. and also that the increase, with one exception, is distributed over the different lines of the company. The present status of affairs is due to the excellent fleet of steamers we now possess, and the growth of the business generally at our various ports of call—giving the company greater freights, and enabling us to transport the same at lower cost."

"The payment of our indebtedness to the Panama Railroad Co. has been continued, without default in a single instance, at the rate of \$20,000 a month, in addition to the fixed charges due that company on traffic account; and we have paid a quarterly dividend of 1½ per cent., leaving us with cash on hand nearly sufficient to pay a year's dividend at the same rate, and a prospect of an increased business for the ensuing year."

"The company, through its able counsel, has laid before the proper committees of Congress, in a formal and official manner, the gross injustice that has been done to American ships in compelling them to carry the mails without compensation, and I am glad to say that this appeal has met with an affirmative response from almost every person who up to this time has had an opportunity to act upon it. Remember that in this matter we only ask to be placed on an equally favorable footing by our Government with vessels carrying the flags of rival nations."

Panama.

This company owns a line across the Isthmus of Panama, from Aspinwall to Panama, 47½ miles. The capital stock of the company is \$7,000,000. The report is for the year ending Dec. 31.

The equipment consists of 21 locomotives, 25 passenger train cars, and 620 freight cars.

The traffic for the year was as follows:

	1883.	1882.	Increase.	P. c.
Passengers.....	303,979	127,616	176,363	138.2
Tons freight.....	215,725	194,550	21,175	10.9

The increase was entirely in local traffic, as noted below.

The earnings for the year were as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Freight.....	\$2,051,693	\$1,845,759	I. \$205,934	11.2
Passage.....	359,065	224,132	I. 134,933	60.5
Mails, etc.....	21,481	26,722	D. 5,241	19.5
Total.....	\$2,432,239	\$2,096,613	I. \$335,626	15.6
Expenses.....	1,121,415	831,951	I. 289,464	34.8
Net earnings.....	\$1,310,824	\$1,264,662	I. \$46,162	3.0
Gross earn. per mile.....	51,023	44,140	I. 6,883	15.6
Net.....	27,420	26,625	I. 795	3.0
Per cent. of exps.....	46.27	39.68	I. 6.59	

Expenses include taxes and miscellaneous payments, as well as actual transportation expenses.

The income account was as follows:

Net earnings.....	\$1,310,824
Interest and miscellaneous.....	358,145
Total.....	\$1,668,969
Interest.....	\$445,333
Bonds redeemed.....	51,000
Subsidy, etc.....	42,444
Dividends, 13½ per cent.....	945,000
Total.....	1,483,777
Balance, surplus.....	\$206,792

The General Superintendent's report says: "The increase in tonnage is mainly due to the work done by the Inter-oceanic Canal Co., and also to the large increase in the number of laborers employed by that company in their various works; all of which has added to our traffic an importance which was formerly unknown. But if the increase is remarkable in the transportation of freight, it is no less in the transportation of passengers. We carried in 1883 in the neighborhood of 303,979 passengers, against 127,616 carried in 1882. Although the tonnage of the railroad

during 1882 was quite satisfactory, we must not lose sight of the fact that the exports from South American countries have diminished during the year 1883. The war between Chili, Peru and Bolivia and the civil war in Ecuador have all contributed to diminish our figures, as compared with former years.

"Coffee, sugar and ivory nuts only show an increase, although small, but you will observe that the export of ores, which formerly was insignificant, has in the past year assumed considerable importance."

"The outlay on the line of the road, including bridges and culverts, in 1883 amounted to \$154,722.37, or \$3,257 per mile. These expenses have considerably increased, even considering the increased traffic; but I regret to be obliged to state that the track at the end of the year was in a pitiable state, and it will be at the cost of great sacrifice that we shall be able to put it in good condition. We shall be obliged to put in at least 35,000 new ties, and the rails at the stations of both Aspinwall and Panama will have to be almost entirely renewed."

"The regular steamship service to the Isthmus and the quantity of merchandise brought by them is about the same as in 1882, notwithstanding the unfortunate circumstances existing in some of the countries of South and Central America."

"The Inter-oceanic Canal Co. continues to import vast quantities of material, and their Wharf No. 5, and accommodations at Fox River, are insufficient for their service."

Grand Rapids & Indiana.

This company owns a line from Fort Wayne, Ind., northward to Petoskey, Mich., 332.50 miles. It has also two logging branches, the Manistee Branch, 14.61 miles, and the Missaukee Branch, 7.64 miles. The report is for the year ending Dec. 31 last.

The company last year operated (and chiefly owned) leased lines as follows: The Cincinnati Richmond & Fort Wayne, from Richmond, Ind., to Fort Wayne, 56.86 miles; the Traverse City, from Walton, Mich., to Traverse City, 26 miles; the Bay View, Little Traverse & Mackinaw, from Bay View, Mich., to Harbor Springs, 5.68 miles; the Grand Rapids, Indiana & Mackinaw, from Petoskey to Mackinaw City, 34.12 miles. These leased lines are not included in the statements of earnings below.

The general account, condensed, is as follows:

Stock.....	\$4,985,081
Funded debt.....	8,000,000
Bond and mortgage.....	27,500
Coupons held by Pennsylvania R. R. Co.....	2,002,868
Coupons and notes held by Pennsylvania Co.....	582,170
Sundry accounts and balances.....	351,543
Total.....	\$15,940,282
Road and equipment.....	\$13,267,016
Stocks, etc., leased lines.....	140,750
Supplies.....	129,586
Accounts and balances.....	292,008
Cash.....	506,830
Profit and loss.....	1,542,093
Total.....	15,040,282

There was no change in the total amount of stock and bonds. Under the new adjustment since made all the outstanding bonds are to be replaced by new consolidated bonds.

The earnings for the year were as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Freight.....	\$1,436,873	\$1,396,631	I. \$40,242	3.0
Passengers.....	792,051	700,500	I. 91,551	4.1
Mail and express.....	53,483	52,713	I. 770	1.4
Miscellaneous.....	40,720	50,447	D. 9,727	14.1
Total.....	\$2,322,133	\$2,260,291	I. \$61,842	3.2
Expenses.....	1,678,939	1,678,237	I. 702	
Net earnings.....	653,194	582,054	I. 71,140	12.2
Gross earn. per mile.....	6,576	6,373	I. 203	3.2
Net earn. per mile.....	1,842	1,641	I. 201	12.2
Per cent. of exps.....	72.60	74.25	D. 2.35	

The expenses were very nearly the same in both years, but there was a fair increase in gross earnings, and consequently in net earnings also.

Included in operating expenses were betterments to the property, the expenditures for which amounted to \$190,162.

The income account was as follows:

Net earnings, as above.....	\$653,194
Interest on funded debt.....	\$449,995
" Penna. Co. note.....	25,903
Losses on leased lines and advances.....	57,175
Total.....	533,073

Balance, surplus for the year.....\$120,121

The report says: "In the 10 years which have elapsed since the road was transferred to the stockholders by the construction company, the annual earnings have somewhat more than doubled; and for the year 1883 they are the largest in the history of your company. The amount would have been still greater but for the numerous difficulties which have affected us, in common with many other roads in the West. During January, February and half of March we were much troubled with drifting snow. In June and July we had floods destroying many hundred feet of track, and taking away some of our bridges—among them that crossing Grand River at Grand Rapids. We immediately replaced the latter with a temporary structure, and have since built a permanent bridge, raising it five feet above the former level."

"The Allegan & Southeastern Railroad, with its 12.78 miles of track, passed from your control, and is to be deducted from the mileage reported for 1882."

"We have sold during the year 21,050 acres of farming land for \$183,291. The sales have decreased considerably, but were made to actual settlers. There have been purchased with proceeds of land sales \$1,242,000 of bonds, and incomes issued in place thereof. The total amount of incomes outstanding at the end of the fiscal year was \$2,339,000, and of interest bearing bonds, \$5,661,000."

"In April last suit was brought by the Pennsylvania Railroad Co., and an injunction asked to restrain your company from the payment of interest coupons until the status of those held by that company should be determined. In consequence, those falling due in April, July and October, 1883, and January, 1884, are still unpaid (Dec. 31, 1883), but the funds necessary for this purpose are ready for application at any moment that the question may be settled. The tripartite agreement under which the Pennsylvania Railroad Co. has foreborne to press its claim, expired by limitation Jan. 1, 1883, and your directors have been, and are, anxiously considering the adjustment of the large debt due that company, now amounting, with interest, to over \$3,000,000. [An adjustment subsequently made and back coupons paid in April. A full settlement has since been agreed on, as heretofore noted.]

"The proportion of operating expenses, including



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE BEST IS THE CHEAPEST.

The above title is a popular maxim of every-day economics which is widely accepted as truth, in some departments of life at least, but which nevertheless seems to be, in many affairs of considerable importance, more honored in the breach than in the observance. In the purchase of a coat, or a pound of sugar, or a horse, everybody warns us against wasting time, thought or money upon an inferior article; and in engaging a cook, or a teamster, or a gardener, even railroad directors recognize the fact that in "getting the best" they are serving their own interests. But in negotiating for a barrel of oil or a supply of steel pens, the hired economist of a railroad company (the Purchasing Agent) sometimes seems to find it necessary in order either to suit his own ideas or the real or supposed wishes of the directors above him, to buy the very poorest article that can possibly be made to pass muster; and in the employment of a man for a brakeman or a track repairer, any idea the division superintendent (or other employing officer) may have of searching out the most suitable man for the place is entirely subordinated, if not obliterated, by an inflexible rule concerning the amount of compensation that is to be paid.

The examples here cited are only a few of the many to be observed on every hand, and which the reader will readily recall; and the application of the principle to one department of railroading is forcibly brought to mind by one of the New York Railroad Commissioners' recent decisions. We refer to that in which the officers are censured for hiring and retaining a telegraph operator who was too young and inexperienced; and an examination of the general subject of efficiency and cheapness, as related to each other, in the employment of operators and others, is what we wish here to make.

We have assumed that the reason the railroad company did not in the instance mentioned have "the best" grade of operator was that it was not willing to pay the market price for that grade; it is not impossible, of course, that other causes had a bearing in the case; but the quality of service is universally dependent so largely upon the price paid, and examples where third or fourth rate service is tolerated because it is low-priced are so common, that there is no danger of our deducing wrong conclusions by reason of erroneous premises.

What, then, is the difference between an operator or station agent worth forty dollars a month and one costing fifty, sixty or more? And is it a fact that the better of the two is in the long run the most economical for the employer?

The argument in favor of the lowest possible salary is simply *present saving*. A rate of wages for a large

class is fixed by a board or a manager with regard simply to making it *low enough*, and with no more consideration of individual circumstances than the Czar of Russia had when he laid out the railroad from St. Petersburg to Moscow by penciling an air line on his ten-inch map. This way of economizing has in its favor the fact that there is no *direct* labor or worry involved in it. If there be any thought, calculation or mental effort entailed, it comes about in an indirect manner; and if one does not allow his mind to turn to the subject too frequently, he can, perhaps, convince himself that the resulting evils arise from some other source. Moreover, it is always so arranged that if there be any resulting anxiety or necessity for laborious planning and rearranging of the service, the burden of it shall come upon some officer other than those making the "master-stroke." Simplicity being always attractive, what, indeed, could be a more seductive plan for saving ten thousand dollars than the taking of a couple of dollars each from five thousand men?

When, however, we come to consider any salary at all above the average a thousand questions arise, and the subject assumes such a complicated aspect that the task of focusing the minds of a board of directors upon it seems to a General Manager or Superintendent entirely hopeless. He might as well try to get them to comprehend the distance from this planet to one of those suns which the astronomers tell us are two hundred thousand times as far off as our sun, or to calculate the amount of bonds per mile which would be necessary to produce the proper amount of profit in the building of a "trunk line" to that dim distance. What reason is there to think that we should have any better employes even if we were to pay more? Wherein do we need improvement on the present degree of efficiency? Does not the business run smoothly enough already? Giving a man more money simply flatters him into shiftlessness by leading him to think that his services are more than satisfactory already; what we want is, to have the men show a little more enterprise in trying to earn what they are already receiving. These are some of the broad yet pointed arguments with which any proposition to get better service is met, unless it is entirely free from financial bugbears; and to overcome these objections the Superintendent must bring forward something beside glittering generalities. He must show figures and be able to make well-defined comparisons with actual facts instead of airy theories. And just here lies the difficulty, for the connection between excellence of service and fatness of dividends does seem rather remote, to be sure, and the task of explaining it cannot be tossed off in an odd hour, even by the most brilliant of superintendents.

An operator who transmits messages in the most blundering manner stands but a small chance of doing damage by his carelessness; a careful person at the other end of the wire will most likely correct him. One who "receives" carelessly rarely does very serious harm, because, forsooth, people have come to be cautious about trusting momentous matters to the telegraph without repetition or other safeguard—and one who from youth or inexperience forgets to deliver a train order, does not generally precipitate any worse disaster than a comparatively harmless collision of freight trains. For isn't his carelessness many times anticipated and neutralized by the train-despatcher, and isn't the latter paid for just this purpose, to grow gray in bearing the burdens of these young and incautious subordinates? Operators whose faults are such minor ones as leaving incompetent substitutes in charge of the office; being absent from the office at the times when most wanted; wasting a half-day's time by reason of ignorance when instruments need slight repairs; inability to apply any natural discretion when cases not covered by the rules come up, and such like matters, escape condemnation on the general ground that there has been no definite money loss and that any attempt at improvement of the service in such minute particulars would at once involve a decidedly definite expenditure for additional supervisory officers. Moreover, many, perhaps most, of the losses and inconveniences resulting from inefficient service, whether in the telegraph department or other station service, fall upon the public primarily; and even if the railroad company is legally holden to make recompense, the contingency of being compelled to do so is so remote that it has little weight with those who look wholly on the money side of the question.

Yet, notwithstanding all these things, good service, even safe service, demands telegraph operators who can be depended upon always to transmit correctly and to "receive" with the utmost care; who shall be

known to have a degree of experience sufficient to fully impress them with a right sense of the gravity of their responsibilities, and who shall have, in short, that natural ability and caution which insure the service against machine-work on the one hand and irresponsible boy's-play on the other. The fact that there is only one chance in ten thousand of any harm ensuing from a certain practice does not of itself justify the taking of that chance, and no view except one excessively warped by the pocket-nerve could for a moment warrant it. Railroads seem reasonably sagacious in profiting by palpable mistakes which can be seen in the past, but, like nearly everybody else, fail (when they do fail) where a searching look into the future is required; and it may be that we have here a suggestion as to the cause of the trouble we are discussing. The improving of the service to a degree much above the general average is a work which must look to the future for its reward, and must be treated as part of a hidden but all-important *foundation*, upon which shall rest a reputation for safety and general excellence which shall be not only fair, but brilliant. In these days, when all claim to be good, the leading position can only be held by the very good; and where the main points are good on all roads, no one road can excel except by close attention to the minutiae. And the railroads have, in their own experience, numerous illustrations of this fact. The value of solid road-bed, unbreakable wheels, power brakes, safety signals and other costly improvements lies very largely in the general reputation which they give to a road; and reputation is a thing of future value, not past profit. That reputation is promoted by freedom from liability to danger from carelessness of employes, as well as by the things just named, ought to go without saying, and when patrons have become satisfied of the safety of a road there is ample opportunity to seek their favor in lesser things. A station employé wins friends for his employer as much by his business-like dealing with customers as by correct methods in the handling of messages or forwarding freight. Politeness is, indeed, already inculcated on every road; but a man, a baggage-master for instance, may be a pink of politeness, and yet prove a mountain of ignorance for passengers to stumble over.

The best *method* of improving many departments of railroad service is undoubtedly to reverse the present plan completely; instead of fixing a standard of compensation and making the quality of the men conform to it, let the standard of qualifications be fixed where it ought to be, and then pay what is necessary to get persons who can furnish them. The pay of any position should be just high enough to keep a person of the proper degree of intelligence in it a *reasonable length of time*; it is futile, of course, to expect an intelligent person not to grow out of any given position; and, on the other hand, it is demoralizing to the service to fix salaries so low that decently qualified persons can promote themselves out of a position before they have become fairly fixed in it. The latter is the case with thousands of stat on agencies and similar offices all over the country; as soon as the incumbent is fairly qualified for his place he betters himself and is replaced by a younger one; and the place is thus kept constantly filled with beginners. Of course the fixing of a high standard of qualification for any kind of railroad service will require both brains and work in the manager's office, and it cannot be denied that this would involve an outlay of money at the very start, for no one manager, however brilliant, can do the work of half a dozen.

But what shall be the incentive to induce the adoption of this revolutionary plan by those whose habits and predilections all tend the other way? Shall it be legislative enactment? The railroads can see from their experience in the matter of freight-car couplers how much better it is to act voluntarily than to be driven by unintelligent legislators; and yet, through the politicians or in some way this matter is not only liable but likely to be taken up. The state or national government, it will be claimed, is just as much interested in having safe operators and other railroad operatives as in securing the proper qualifications of steamboat captains, which are already the subject of special laws. Will competition compel improvement in service? Experience in other departments shows that it will just as soon as some one shall make a beginning. In the competition of the Baltimore & Ohio Telegraph Company with the Western Union, we have an example of the success that attends enterprising methods applied at *every point*, and in the striving of the West Shore Railroad to match the New York Central we can see a conspicuous failure of mere competition where a broad and scientific plan was de-

manded instead. The new company, in the matter of road-bed, equipment and other points met the old one and, perhaps, "went them one better," but from the collisions and other irregularities we read of, it would seem that in the matter of efficiency of employes the two roads are on the same dead level of mediocrity. Apparently, nothing can be plainer than that, as between two competing railroads, that one which shall first convince the public that its conductors are all natural commanders, that every one of its enginemen is a hero, that none but experienced and cautious operators are employed, and that unremitting efforts are put forth to maintain the highest possible standard, will, other things being equal, secure the most favor from that public.

GREAT FLUCTUATIONS IN MAINTENANCE EXPENSES.

The Atchison, Topeka & Santa Fe Railroad, which in 1883 increased its net earnings over 1882 chiefly by a very large decrease in working expenses, this year has a large increase of expenses, indicating that expenses were below the average rate in 1883, though something may be due to a heavier traffic carried at lower average rates. For July this change is especially marked. The gross earnings, expenses and net earnings for the month for three years having been:

July:	1884.	1883.	1882.
Gross earnings.....	\$1,301,639	\$1,325,710	\$1,254,442
Expenses.....	817,866	557,707	673,773
Net earnings.....	\$483,773	\$768,003	\$580,669
P. c. of expenses.....	62.8	42.1	54.3

Thus the expenses decreased \$116,066 from 1882 to 1883, in spite of an increase of \$71,268 in gross earnings, which was doubtless due to an increase in traffic; but this year, with a small decrease in gross earnings (though very likely a considerable increase in traffic) and an increase of 7 per cent. in mileage, there is an increase of no less than \$260,159 (46½ per cent.) in expenses, making them 21½ per cent. more than 1882 even, and making the average for the three years just about equal to the expenses in 1882.

Of course the expenses of a single month may vary greatly from the average, according to the greater or less amount of renewals that it may be possible or advisable to make in the month, and the fluctuations of this road's expenses for the seven months ending with July have been comparatively much less than for July alone, its earnings and expenses having been:

Seven months:	1884.	1883.	1882.
Gross earnings.....	\$8,948,454	\$8,604,704	\$8,557,478
Expenses.....	4,928,741	4,198,024	5,389,237
Net earnings.....	\$4,019,713	\$4,406,680	\$3,168,241
P. c. of expenses.....	55.1	48.3	63.0

In expenses there was a decrease of no less than \$1,191,213 (22 per cent.) from 1882 to 1883, with a small increase (1.6 per cent.) in earnings, and probably a larger increase of traffic. From 1883 to this year there was an increase of \$730,717 (17 per cent.) in expenses, leaving them, however, still \$460,500 (8½ per cent.) less than in 1882. Meanwhile the gross earnings this year were \$391,000 (4½ per cent.) more than in 1882 and \$253,750 (3 per cent.) more than in 1883, with an increase of 7 per cent. in mileage.

The gains in gross earnings are the more encouraging because this road received a large income in 1882 (\$1,090,000) and a considerable one in 1883 (\$386,600) for the carriage of construction material for new railroads, and very little this year. It has had the advantage of the exceptionally abundant crops of Kansas, where most of its road is, for two years past, and will have the advantage of the still larger production this year. The great changes in the percentages of its working expenses indicate that more than the average renewals were made in 1882, and less last year, with a return to or toward the average this year. In repairs of roadway and track alone last year there was a decrease of \$532,457 (34 per cent.) from 1882 to 1883, and in renewal of track a decrease of \$700,883—from \$1,203,702 to \$502,819 = 58 per cent. Of course there could have been no such changes in the depreciation due to the wear that actually occurred in the two years. But the expenditure for the renewal of track was at the rate of \$663 per mile of road in 1882, manifestly much above the average requirements on such a railroad, a great part of which has a very thin traffic. The Chicago, Burlington & Quincy in 1883 expended \$904 per mile for repairs and renewals of roadway and track; the Atchison \$805 in 1883, and \$1,530 in 1882. The New York Central spent \$725 per mile of road (\$268 per mile of track) for rails for renewals in 1882-83, and \$2,556 per mile (\$950 per mile of track) for other repairs of roadway and track, having 16,956 train-miles per mile of road, against 3,539 on the Atchison. The total road repairs of the Chicago & Alton were \$1,129 last year, against \$805 on the Atchison; the Chicago, Milwaukee & St. Paul, which has now a large amount of road with thin traffic (4,190 train-miles per mile of

road, against 3,539 on the Atchison) expended but \$71½ per mile of road for rail renewals last year, not as much as \$180 in any year since 1877, and but \$428 per mile for all road renewals and repairs last year, and not more than \$800 in any year.

There is thus reason to believe that the road maintenance expenses which have fluctuated so greatly on the Atchison were not so much below the average last year (if they were any) as they were above the average in 1882; though when exceptionally large rail renewals have been made for a time, as on the Atchison both in 1881 and 1882, the natural result is a decrease from the average requirements in following years, except when the first iron rails of a road are disappearing rapidly, when the renewals may be above the average not only for two years but until most of these rails are renewed, when the requirements may be extremely small for many years, as they are now on many of our roads, forming an almost insignificant proportion of their total working expenses, especially when prices are as low as they are now. An extreme case is that of the Union Pacific. In a review of its maintenance expenses March 21, we showed that, with no change in mileage worked since 1881 except an increase of 37 miles in the sidings, its expenditures for renewals of rails had been:

1880.	1881.	1882.	1883.
\$1,106,677	\$1,700,426	\$556,143	\$249,115

Such tremendous variations in one of the items are likely to mislead in making estimates of future net earnings. The largest are vastly above the average yearly requirements and the smallest probably decidedly below. The Atchison in 1882 and 1883 had almost exactly the same mileage as the Union Pacific and had last year nearly the same train mileage (1½ per cent. more). Its expenditures for rail renewals have been (only 997 miles in 1879 against 1,820 in 1882 and 1883):

1879.	1880.	1881.	1882.	1883.
\$300,231	\$400,516	\$1,336,325	\$1,203,702	\$502,819

Last year and the year before, therefore, notwithstanding the great decrease in these expenditures, it still paid out twice as much as the Union Pacific on this account.

This matter of expenditures for maintenance, especially since the introduction of steel rails, and when earnings are decreasing is an important one. Where hundreds of miles of rails (iron or steel) are laid in one year, they are apt to require renewal about the same time, and after exceptionally small expenses under this head for some years we may have exceptionally large ones for a time. This is what may be called a natural variation in working expenses, which is often made greater by the action of the managements in adapting expenditures to the financial needs of their companies. It is possible to decrease maintenance expenses very largely for a time, not only in the road but in the rolling-stock department, especially if traffic falls off, and it is done to a very great extent, and in not a few cases where the saving of \$100 this year means the expenditure of \$125 or \$150 next year or the following year, which is in effect paying exorbitant interest for the use of money. In not a few cases this policy practically cannot be avoided, as in this way only can the property be preserved for its owners, the shareholders, whose agent the management is; but there are many cases where this policy of reducing maintenance expenses below actual requirements is followed simply for the purpose of maintaining a rate of dividend previously paid, and thus prevent so far as may be a fall in the market price of the stock. This simply enables stockholders to obtain money from new investors on false pretenses—on the false pretense that the profits of the company are greater than they are actually and legitimately. Sometimes the management responsible for this policy profits by this false pretense, and sometimes it does not, but it is likely to be encouraged in it by the large stockholders. We believe, however, that the object arrived at, the payment of a "regular" rate of dividend, is not a desirable object. There is no reason why railroad shares should not suffer the ordinary fluctuations that attend other industries. In this country especially, where as much as half the whole capital of railroads is in bonds, the interest on which should be, so far as possible, beyond question, the shareholders should be satisfied to receive smaller dividends in bad times—to take whatever surplus over fixed charges their road earns legitimately, keeping up maintenance fully at all times. In the comparatively few cases where dividends are kept up at a regular and pretty high rate through good and bad times, there is much jealousy on the part of the owners of other property who find their profits reduced or entirely cut off when times are bad. But in far the greater number of cases the result of this policy is to make dividends fluctuate more than they otherwise would, for the "starving of the road" cannot last

very long; the \$100,000 saved for one or two or three years has to be made up finally with perhaps 50 per cent. interest, and then, probably enough, instead of a reduction of dividends, they cease entirely. If meanwhile the old holders of the stock have sold out, as they not seldom do, they got their money on false pretenses, which have perhaps been made for them by their agents who conduct the operations of their railroad, who take their cue, however, and usually must, from the large stockholders who are virtually their employers, and often are directors, and thus able to determine the policy of the road.

There has been within a year or so a large fall in the prices of nearly all materials that railroads use, and at places some decrease in wages. Some reduction in the legitimate working expenses for doing the same amount of work is therefore to be expected. But when decreases are very large they ought always to be explained. They may be perfectly proper, as when on the Atchison and the Union Pacific, after renewing almost the whole track in two or three years, little remains to be done afterward. In such cases quantities used are often a better criterion than expenditures, but this is not practicable for all items. It does excellently for rails and ties, and probably quantities of the leading materials consumed in other maintenance work might be given in a few lines with great advantage. But a few words of truthful comment would prevent any misunderstanding of the matter.

There are, doubtless, cases where full maintenance is practicable and yet not advisable. Aside from the obvious cases of rails and ties, when those put in are inevitably the worse by one year's wear and decay at the end of the first year, and yet will not need renewal for several years, we have many roads at such a time as this equipped with rolling stock considerably in excess of present requirements. When a car needs repairs it may be side-tracked and one of the surplus stock taken in its place, and the damaged car left without repairs till needed. If repairs are made on cars not needed, and not likely to be needed for some time, the interest on the money from the time the repairs are completed to the time the car is needed is wasted. A large amount will be saved in renewals in this way this year (and very likely a much larger amount by neglecting renewals which are actually needed), and there should be no objection to it if the facts are truthfully reported, though there will be an actual depreciation in the value of the property of the company during the year. We advise those who wish to know the true condition of railroad companies to watch maintenance expenses very closely this year, and car maintenance expenses more closely than other items. Dividends paid out of savings in maintenance are not likely to be permanent, unless a revival of business helps them out.

The decrease in maintenance expenses this year, taking the railroads of the country as a whole, will not be so great as it would have been had the previous year or two been profitable ones. But a great many railroads have been suffering from a decline in earnings for three successive years, and that in 1881-83 was generally unexpected. The result has been that many companies began to cut down expenses so far as practicable nearly three years ago, and by this year they had reached the point where a further decrease was impossible, except so far as made by the fall in prices. We have seen this in reviewing reports of many different companies.

It is, perhaps, unfortunate that we should have begun this article with an examination of the expenses of the Atchison, Topeka & Santa Fe Company. But it was the great variation in its maintenance of road expenses that suggested it. Its other maintenance expenses were larger in 1883 than in 1882, and the comparisons that we have made of its road expenses do not indicate that they were below the average, certainly not much below—even in 1883. But such variations as its needed to be pointed out, and in that connection it seemed desirable to mention further variations which can be made, and in times often are made, by "starving the road," or neglecting renewals and repairs that ought to be made.

Balance Sheets and Inventories.

The Erie report to the New York Railroad Commission for the quarter ending with June and its balance sheet at the close of that quarter were looked for with unusual interest because of reports of a great floating debt and curiosity to know what the losses by the Grant & Ward failure may be. No very definite information on these points can be obtained from the balance sheet, however. What Grant & Ward owe remains a debt which it will not be proper to charge off so long as there is

a prospect of collecting any of it, and at the end of June this question was not settled. Compared with the balance sheet of March 31, there is a decrease of \$487,234 in the item of loans and bills payable, an increase of \$676,344 in interest due and accrued, including, doubtless, the unpaid coupons of the second consols due June 1, an increase of \$188,761 in traffic balances due, an increase of \$874,889 due for wages and supplies, and a decrease of \$182,455 in "surplus." In the assets there is an increase of \$288,000 in expenditures for equipment (principal of car trusts, probably), of \$392,832 in accounts receivable, due by agents and other companies), of \$409,476 in cash and of \$114,145 in bills receivable; with a decrease of \$404,069 in supplies on hand. So far as the balance sheet shows, there are additional assets for all the additional liabilities except \$182,455, the profit and loss (surplus) having been diminished by that amount. But in the nature of things no single entry in a balance sheet can give an idea of the value of what is covered by the charge. Among the Erie assets is the sum of \$7,426,495 "due by agents and other companies and individuals." Now this sum doubtless includes thousands of accounts receivable, of very different degrees of value and availability. There may be a large sum due from Grant & Ward, of which only 1 per cent will be collected; certain advances to the Chicago & Atlantic, which that company may not be able to pay for years, yet which remain a debt due, and which may in course of time result in giving the Erie possession of the Chicago & Atlantic Railroad, when it will be a very tangible asset. All these things have their place on a balance sheet. When an account becomes entirely hopeless, it should be charged off, and then will appear in the balance sheet in profit and loss instead of accounts due. Those who ask that the actual value of the different items of assets should appear in a balance sheet confound a balance sheet with an inventory. A balance sheet belongs to book-keeping, and records everything, and all assets appear at their cost, whether worth more or less than what they cost, and even when charged off as worthless, they are still recorded in the profit and loss. An inventory, on the other hand, takes no heed of cost except as an aid in ascertaining values, and its footing of assets may be vastly greater or vastly less than that of the proper balance sheet of the same concern. No one finds fault because a railroad is entered as an asset at the full cost of its construction, although it may not be earning 1 per cent. on that cost, and could be bought (by purchasing its securities at the market price) for one-fourth of its cost. It would not be proper to inventory it at its cost, but it is to charge it at cost in the balance sheet.

In Belgium, and perhaps in other European countries, the law provides both for an audit and an inventory of joint-stock companies. The audit sees that the book-keeping is exact, and the inventory enumerates, describes and estimates the value of the various assets. Book-keeping can do much, but it cannot alone show the exact condition of any enterprise. What it has cost, what it owes, what it has earned and what it has paid, book-keeping shows; but it shows assets just as great when they have ceased to make any return as when they yielded great profits, and does not distinguish between John Doe's account, which will not sell for 75 per cent. of its face, and Richard Roe's which will bring its face with accrued interest.

The Reduced Dividend of the New York Central.

The New York Central & Hudson River Company, which heretofore, ever since its organization, has paid its shareholders 8 per cent. yearly, and for ten years has paid 2 per cent. quarterly, announced last Monday that its quarterly dividend, to be paid Oct. 15 next, will be 1½ per cent. The quarterly reports to the New York Railroad Commission have shown that in the first half of the year 1884 its profits were but \$2.05 per share, and for the first quarter of its fiscal year also \$2.05. For the nine months ending with June it earned a profit of \$4.10 per share, but paid \$6 per share. For the three years ending with September, 1883, its profits per share were \$23.43; its dividend \$24. We have to go back to 1879-80 to find undivided surplus profits from which the \$1.90 of excess of dividends over the profits for the first three-quarters of this fiscal year could be paid. The surplus that year was no less than \$3.82 per share. But of course the accumulated surplus since the consolidation, amounting to \$15,500,000 at the end of last year is not invested in assets which can be realized in cash, but in additions to the property of the company which it is desirable not to have represented by additions to the stock or debt until the road can earn interest upon it; while actually its profits are smaller and not larger than before these additions. Under these circum-

stances the company ought to have divided this year no more than it earned this year. But there is, probably, no case where a change from the long-continued though vicious practice of paying a fixed rate of dividend would have had so disastrous effect. The company has paid 2 per cent. quarterly or 4 per cent. half-yearly so long that a large class of investors have come to look upon the stock as exempt from all the ordinary dangers that affect railroad investments—as, indeed, a sort of bond, on which interest at the rate of 8 per cent. is owed. This belief was never anything but a superstition. The New York Central is not exempt from any of the ills that railroads are heir to. It occupies a field which affords a heavier traffic than any other part of the country, and until recently this field has been invaded by competing roads much less than most other parts of the country which offered not one fourth of the traffic. But the field was never secure to it, and it has at last been invaded by two armies, as it were; while there has also been a great increase in the lines which compete with the New York Central's western connections, tending to reduce the share of the through traffic which it can command. Through rates have not been as high, on the average, this year as last; but the decrease in profits from through traffic has been due much more to a diversion of traffic than to lower rates. West-bound rates have been well maintained, and through passenger rates in both directions better than in most years down to the close of the period covered by this company's last report of earnings. The new competing roads have not yet by any means secured so large a share of the traffic as they are likely to command hereafter, if they are made fit to carry it, as they almost certainly will be some day; but probably it will be possible hereafter to make some rates somewhat higher than they have been. The only serious reduction of through rates, however, that is on east-bound freight, in the first half (but chiefly in the second quarter) of the year, was not due to the new New York railroads, however, which as yet do not have much of that business.

As the New York Central earned a profit of but \$2.05 per share in the first half of 1884, business will have to mend more than it has yet to enable it to continue to pay 1½ per cent. quarterly. Probably it will earn more in the last half of this year than it did in the first half, but it seems sanguine to expect a profit of \$3.95, which would bring up the profits of the calendar year to \$6 per share; \$3 in the last half, which is usually the best half. will be doing better than the present prospects promise, for the current quarter (ending with September) cannot have been a good one. The following quarter should be very much better, and will need to be if dividends are to be maintained at the rate of 1½ per cent. quarterly. It would be much better, we are sure, to divide what the road earns, be it much or little. Shareholders do not need to have railroad companies take care of their profits for them. They can do that themselves. Dividends of 2½ per cent. in one half of the year and 3½ in the other will be just as satisfactory as 3 per cent. in each half, just as soon as shareholders become accustomed to it, and more so if they know that they get all that their road earns and nothing that it only hopes to earn.

The grain movement was much heavier in August than in previous months, and compares fairly with other years after a good harvest so far as receipts of the Northwestern markets are concerned, but not as to their shipments, while in receipts and exports of Atlantic ports it is far behind previous years. Thus the receipts of the eight Northwestern markets for four weeks in August for the last six years have been:

1879.	1880.	1881.	1882.	1883.	1884.
26,527,588	31,285,242	24,300,081	23,020,611	29,397,568	28,893,171

The shipments of these markets for the same four weeks were:

1879.	1880.	1881.	1882.	1883.	1884.
24,924,770	26,510,751	22,004,060	19,071,003	23,020,287	20,005,975

while the Atlantic receipts were:

1879.	1880.	1881.	1882.	1883.	1884.
31,115,615	31,425,374	22,202,901	23,408,077	17,961,301	15,207,589

and the exports meanwhile for five years:

1880.	1881.	1882.	1883.	1884.
26,546,881	15,790,680	12,611,843	14,066,165	10,468,272

The receipts of the Northwestern markets are a trifle less than last year, but are above the average of the five years previous. The shipments of these markets, however, were less than in any of the five years previous, except 1882, and 15 per cent. less than last year. The receipts of the Atlantic ports are much less than in any other year, 15 per cent. less than last year, a third less than in 1881 and 1882, and not half as great as in 1879 and 1880. There is a similar falling off in the exports, which were nearly a fifth less than last year, and 60 per cent less than in 1880.

It should be said that this somewhat exaggerates the amount of the decrease in all these items, and

largely the percentage, because the flour shipments are not included, and these have increased and not decreased. The increase is quite large in amount since last year—in Northwestern receipts equivalent to about 600,000 bushels, in Northwestern shipments to nearly 1,800,000 bushels, in Atlantic receipts to 717,000, and in exports to 670,000 bushels. This, however, leaves the movement as a whole unusually light this year, as will appear from the following statement, which includes grain and flour reduced to equivalent bushels:

	Northwestern		Atlantic	
	Receipts.	Shipments.	Receipts.	Exports.
1879.....	28,650,854	26,401,849	35,414,114	23,748,570
1880.....	33,785,894	29,242,305	36,094,771	20,003,372
1881.....	31,882,091	25,709,414	26,341,156	18,052,208
1882.....	25,804,441	21,924,142	27,329,454	15,634,541
1883.....	31,883,847	26,556,138	22,352,891	15,333,719
1884.....	31,969,605	24,417,263	20,284,888	13,465,108

This simply reduces the difference. The Northwestern receipts are nearly the same as last year and in 1881, much more than in 1882, and considerably less than in 1880. The shipments of these markets are less than in any year except 1882, and 8 per cent. less than last year. The Atlantic receipts are smaller than in any other year, 10 per cent. less than last year, and more than 40 per cent. less than in 1879 and 1880. The exports are also less than in any other year, 12 per cent. less than last year, 54 per cent. less than in 1880, and 43 per cent. less than in 1879.

Thus, as we said with regard to the grain movement above, the movement this year has been large only as regards the receipts of the Northwestern markets. Stocks have accumulated there during August more than in any previous year, but in spite of low prices the Atlantic cities have received less and exported less than for many years.

It is announced that Mr. George R. Blanchard has resigned his position as a Vice-President of the New York, Lake Erie & Western Railroad Company. Mr. Blanchard has been one of the most prominent of railroad men for most of the time since he has held the position of Vice-President, and before that of Traffic Manager of the Erie; having conducted the larger part of the company's numerous and complicated negotiations with other companies, regarding traffic, etc., which have absorbed much of the time of leading railroad men of late years, and which serve better than almost anything else to make a man known in the railroad community. Perhaps no one of the chief officers—presidents and managers chiefly—engaged in these negotiations, has been more successful in attaining his ends than Mr. Blanchard, who seems to have an extraordinary aptitude for such work, always commanding attention to his proposals, and exerting an unusual degree of personal influence. He has also become well known to the general public by his numerous arguments relating to railroad affairs, made chiefly before legislative and congressional committees. Having been in the traffic department of railroads from his youth up, and in positions which made him familiar with all practices and their variations from time to time, and having an extraordinary memory, these arguments, and especially his evidence before the Hepburn Committee, which covered many hundred pages, are great storehouses of facts in the history of American railroad practice. Mr. Blanchard is also a man of many accomplishments and refined tastes, having even "dropped into poetry" occasionally, we believe, and has a very large number of influential friends, outside as well as among the ranks of railroad men.

The trunk lines continue to do their business at New York chiefly through the ticket brokers, who are reaping a harvest thereby. There is no change in the situation. The scalpers are supposed to get a commission of five or six dollars on a ticket, and they divide it with the purchaser, charging usually \$16 for an \$18.50 differential ticket from New York to Chicago. The Pennsylvania continues to sell only at its own offices and at regular rates, and, strange to say, it seems to be doing a fair business. It claims to be the only really first-class route, and if it can get a fair business at \$20 while other roads over which tickets can be had at \$16 do not get much more, its claim will be pretty well established. The scalpers are delighted, and would like nothing better than to have this condition of things keep on forever. They recognize the fact that the sooner the different railroads agree the sooner their harvest will close, and they are said to be working very shrewdly to keep the railroads outside of the pool satisfied with the share of business they get, which, when rates are so low by the old lines would naturally be very small. If the West Shore, the Lackawanna and the Grand Trunk should find their business dwindling away under the competition, they might conclude that they would do better to come into the pool. But that would be dire disaster to the scalpers, and they will use extra exertions and sacrifice an unusually

large part of their commissions to persuade a goodly number to buy tickets by the lines which might soon spoil their business.

Of 20 railroads that have reported their August earnings so far, only three show any increase over last year. The aggregate mileage and earnings and the average earnings per mile of the 19 roads were:

	1884.	1883.	Inc. or Dec.	Pc.
Miles.....	26,112	23,768	+ 2,346	9.9
Earnings.....	\$12,407,095	\$13,317,256	-\$820,861	6.2
Earn. per mile...	479	560	- 81	14.5

With an increase of one-tenth in road there is a decrease of one-sixteenth in earnings per mile, resulting in a decrease of 14½ per cent. in the average earnings per mile. This will probably be much more than the average decrease of all the roads that report, as the roads that have reported thus far include the important Northwestern lines which, with a large gain in mileage, have a decrease in earnings, among which are the Canadian Pacific, the Northern Pacific, the Chicago, Milwaukee & St. Paul, the Chicago & North-western and the St. Paul & Omaha. The Northern Pacific, the St. Paul & Omaha and the Manitoba earned less in August than in July. Heretofore the St. Paul & Omaha always, and the Northern Pacific since 1880, have earned more in August, as in 1881 and 1883 the Manitoba did also. The Burlington, Cedar Rapids & Northern shows a gain over July, but it is smaller than in any previous year and not half as great as last year. The Chicago & Alton, which is far enough south to feel the new crop very decidedly in August, has a larger decrease of earnings (compared with last year) than in any previous month, yet an increase of 18½ per cent. over July, while last year this increase was 21 per cent. The St. Paul & Duluth has a larger decrease than in any other month. The Eastern Illinois had a smaller decrease compared with last year than in most months previous; but its increase over July was but \$18,502, against \$38,494 last year. The Detroit, Lansing & Northern, which should have been carrying some of the new Michigan winter wheat in August, has the very large decrease of 24½ per cent. compared with last year, and earned but \$17,191 more than in July, while last year it earned \$30,993 more. In the South, the Louisville & Nashville had a much larger decrease from its last year's earnings than in any previous month, and gained but \$50,265 over July, against \$118,051 last year; and the Mobile & Ohio, also has an exceptionally large decrease from last year, and its gain over July is \$13,939 against \$22,120. The Long Island's decrease from last year was less than in July, and its increase over July is greater than then. The Central Pacific makes an exceptionally favorable statement for August, for though it has less earnings than last year, the decrease was much less than in previous months (5.7 per cent., against 9 per cent. for the seven months ending with July); and it gained \$292,000 in August over July, which is more than in any previous year. July is the first month of the California crop year, but grain has less effect on this company's earnings than on those of most Western roads.

Thus generally the August returns are unfavorable, showing not only large decreases from last year's earnings, but much less than the usual improvement over July.

August is the beginning of a new traffic year for many roads, and it is not encouraging to see it begin so unfavorably. But for more roads the year begins later—for Southern and Northwestern roads, and indeed, most Northern roads.

Erie Earnings in July.

The report of the earnings and expenses of the New York, Lake Erie & Western Railroad for July shows larger gross and net earnings than in any previous month of this year, though the gross were \$236,501 (14 per cent.) and the net \$112,643 (20 per cent.) less than last year, no account being taken of the leased New York, Pennsylvania & Ohio Railroad. During July the road had the benefit of the advance from 15 to 20 cents per 100 lbs. in the through east-bound rate, 15 cents having been the rate for three months previous. It is, therefore, interesting to compare the earnings in July with those in previous months. Now the gross and net earnings in each month of this calendar year have been:

	Gross earnings.	Expenses.	Net earnings.
January.....	\$1,272,391	\$1,098,257	\$174,074
February.....	1,233,409	925,062	308,347
March.....	1,177,892	943,891	234,001
April.....	1,397,726	958,377	439,349
May.....	1,308,545	968,768	341,777
June.....	1,281,157	290,529	360,828
July.....	1,458,186	1,007,307	450,879

The gain over June is \$177,000 (14 per cent.) in gross and \$90,250 (25 per cent.) in net earnings, in spite of an increase of 9½ per cent. in expenses. This is not a very large sum for a road like the Erie. The effect of the advance in rates, however, extended to the leased Ohio road, and the excess of its rental over its net earnings was only \$9,576, against \$47,073 in June and \$47,905 in May.

The gross and net earnings and working expenses of the Erie proper in July for seven successive years have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1878.....	\$1,157,601	\$830,982	\$326,709
1879.....	1,273,533	957,883	315,650
1880.....	1,580,975	1,014,658	566,317
1881.....	1,787,081	1,114,673	672,407
1882.....	1,850,280	1,132,989	717,291
1883.....	1,694,687	1,131,165	563,522
1884.....	1,458,186	1,007,307	450,879

The gross earnings were therefore less this year than in 1879, and 21½ per cent. less than in 1882, when they were largest; the working expenses were also the smallest since 1879, and 11 per cent. less than last year, when they were largest, and the net earnings too were the largest since 1879, and 38 per cent. less than in 1882, when they were largest, and even 29 per cent. less than in 1880.

The leased Ohio road yielded a profit of \$53,251 in July last year, against a loss of \$9,576 this year, so that the profits of the Erie company to be compared with the net earnings, for the first five years in the above table were \$616,773 last year and \$441,303 this year, a decrease this year of \$175,470, or 28½ per cent. The profits, however, are the largest since November last.

For the ten months of its fiscal year ending with July, the gross and net earnings and working expenses of the Erie proper (excluding the leased Ohio road) have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1877-78.....	\$12,860,778	\$8,002,102	\$4,858,618
1878-79.....	12,989,203	9,385,218	3,603,985
1879-80.....	15,299,817	9,657,040	5,642,777
1880-81.....	17,208,511	11,008,190	6,200,321
1881-82.....	16,252,416	10,974,092	5,278,324
1882-83.....	16,401,064	11,336,019	5,065,045
1883-84.....	14,351,811	10,260,772	4,091,039

Compared with last year the decreases are:

Amount.	Gross earnings.	Expenses.	Net earnings.
Per cent.....	\$2,049,253	\$1,066,247	\$983,006
	12.5	9.4	19.4

Compared with 1880-81, when gross and net earnings were largest, the decreases are:

Amount.	Gross earnings.	Expenses.	Net earnings.
Per cent.....	\$2,856,700	\$738,418	\$2,118,282
	17.8	6.7	34.2

The decrease in net earnings since last year is equal to more than half the interest on the second consolidated bonds; since 1881 it is more than the whole interest.

The lease of the Ohio road has made a difference in the profits of the Erie company for the last two years, however, there having been a profit of \$155,142 during the three months of the lease last year, and a loss of \$331,534 during the ten months of it this year, so that the profits of the Erie for the whole mileage worked by it were \$5,290,187 last year and \$3,750,505 this year, showing a decrease of \$1,469,682, or 28 per cent., and making them smaller than in any other year since the reorganization except 1878-79, and \$2,449,816 (39½ per cent.) less than in 1880-81, when they were largest.

The two remaining months of the fiscal year are likely to show somewhat larger profits than in any previous month since November, as August always, and September in every year but one of railroad war, has been a better month than July; but the decrease in profits, compared with last year is likely to be greater than in any previous month, for the profits in these months last year were phenomenally large—much larger than in any other month in the history of the road, namely, \$1,100,065 in August and \$1,037,413 in September, which is nearly as much as the profits for the eight months ending with July this year (\$2,204,058). A decrease of a million of dollars in these two months will leave the profits 29 per cent. larger in each than they were last July, which is greater than the gain over July has been in most years. It is to be said, however, that a comparatively small amount makes a large percentage of the monthly net earnings now, and but for the absence of any great increase in traffic which sometimes occurs after harvest, a gain over July larger than 29 per cent. might be expected this year. There may be one as it is, but the prospect is that the profits of the year ending Sept. 30 from the working of the road will fall below \$5,000,000, while for the six years previous they have been:

1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.
\$5,009,114	\$4,767,324	\$7,049,183	\$7,459,375	\$6,887,680	\$7,357,604

In the earlier years full interest was not due on a large part of the funded debt. The various interest charges and rentals payable from profits amounted to \$6,176,000; the interest on the second consols, one-half of which has not been paid, amounts to \$2,015,844 this year. There is some other income besides that from roads, but also other expenses, which usually nearly equal the receipts. It thus seems quite possible that the profits of the year will not quite equal the interest and other prior charges after deducting the interest on the consols.

International Inventions Exhibition.

On another column we give some particulars of an International Inventions Exhibition which is to be held in London during the summer and fall of next year.

This Exhibition is the third of a series. The first was held in 1883, and was devoted to all subjects connected with fishing. This country was well represented and the exhibition was in every respect a great and somewhat unexpected success, and was attended by over 100,000 persons every week for six months. The Exhibition this year is devoted to sanitary subjects, and is popularly known as "The Fisheries," and has ever been more largely attended than its predecessor, "The Fisheries."

Americans have the reputation of excelling more in inventions than in means of preserving health, or even securing fish; and it is therefore to be hoped that the exhibits sent to the forthcoming Exhibition by this country will well

sustain our national reputation. The Exhibition should afford inventors an excellent opportunity to familiarize the people of Europe with many improved appliances in railroad working which are little known there. We would suggest that a dining car in full operation, running say on a circular track, would be immensely popular, and would create such a strong feeling in favor of these institutions that their adoption would become general. At present, we believe, their use in Europe is confined to one or two lines in Russia, a train running between Paris and the Black Sea and a train running between Leeds and London. The track might embody several American inventions that are little known in Europe, such as the spring-rail frog, the Wharton switch, Bush's interlocking track-bolt, etc.

The locomotive might combine several inventions whose use is almost exclusively confined to this country. We might particularize the Wooten fire-box, the Allen-Richardson balanced slide-valve, one of the numerous forms of sight feed lubricators, and a dumping ash-pan. Many other inventions might be enumerated.

To avoid needless disappointment to a numerous class, we may here warn any patentees of car-couplers that central buffers are almost unknown in Europe, and that therefore the useful percentage of their special contrivances would be even smaller on the other side of the water than it is here.

The Exhibition is held in some buildings surrounding the Horticultural Gardens, which are thrown open to the public during the Exhibition. The amount of space is therefore very considerable, and the Exhibition is singularly well situated, being easily accessible by rail from all parts of England.

Chicago Shipments Eastward.

The through and local shipments of flour, grain and provisions eastward from Chicago, for the week ending Sept. 6, by the incomplete report to the Board of Trade, were 27,285 tons this year, against 40,994 tons last year, and 30,087 in 1882. The decrease from last year is one-third and from 1882 nearly one-tenth. For six successive weeks, the tons shipped and the percentage going by each road have been:

	Aug. 2.	Aug. 9.	Aug. 16.	Aug. 23.	Aug. 30.	Sept. 6.
Tons:						
Flour.....	3,419	3,313	3,849	3,425	3,406	3,774
Grain.....	14,492	13,004	16,754	23,268	18,972	15,531
Provisions.....	6,512	6,613	8,309	7,712	7,554	7,980
Total.....	24,423	22,930	28,912	34,405	29,932	27,285
Per cent:						
C. & Grand Tr.	17.2	17.0	17.6	13.5	12.2	8.6
Mich. Cen.	9.1	11.0	14.2	11.8	9.1	10.7
Lake Shore.....	17.8	18.2	16.0	21.2	16.9	19.0
Nickel Plate.....	9.5	9.8	11.4	12.2	13.5	9.8
Ft. Wayne.....	18.1	17.1	15.9	18.6	16.8	16.0
C. St. L. & P.....	7.2	6.2	7.0	6.3	10.1	13.6
Balt. & Ohio.....	11.0	10.3	8.6	7.9	11.4	12.2
Ch. & Atlantic.....	10.1	9.5	9.3	8.5	10.0	9.0
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

Thus there was a further decline in the total shipments last week, making them the smallest for four weeks, and 20½ per cent. less than in the third week of August. Flour and provision shipments have increased, but grain shipments have fallen off largely, 33½ per cent. in two weeks.

Though the decrease has not been in the staples of which the Chicago & Grand Trunk usually takes a large share, it carried a much smaller percentage of the whole than in previous weeks, while the lesser Pennsylvania road has greatly increased its tonnage by taking more than a quarter of the provisions, and the Fort Wayne has taken more than a fifth of them, leaving less than 18 per cent. to the Grand Trunk. The shipments of provisions by these three chief carriers of them have been:

	Aug. 2.	Aug. 9.	Aug. 16.	Aug. 23.	Aug. 30.	Sept. 6.
C. & G. T.....	2,153	2,124	2,553	2,166	2,090	1,431
Ft. Wayne.....	1,088	1,612	1,109	2,103	1,172	1,719
C. St. L. & P.....	335	422	704	652	1,382	2,065
Other roads.....	2,936	2,485	3,943	2,791	2,961	2,765
Total.....	6,512	6,643	8,309	7,712	7,554	7,980

It appears from this that in the first three of these six weeks the Grand Trunk took more than both the Pennsylvania roads, and a great deal more in two of the weeks. But in the last three weeks the provision shipments by it have been declining, while by the Chicago, St. Louis & Pittsburgh they have trebled, and last week the two Pennsylvania roads carried 165 per cent. more than the Grand Trunk, which three weeks before had carried 41 per cent. more than they. This leads to the suspicion that perhaps Philadelphia or New York or Baltimore steamers have been making extremely favorable rates for provisions like those which, we were told, a few weeks earlier made it possible for the Chicago & Grand Trunk to make lower export rates via Montreal than could be made by any other route. Something evidently made the Pan-handle route exceptionally attractive to provision shippers last week, enabling it to secure six times as much as five weeks before, though the total shipments increased but one-fifth meanwhile.

In percentages of total shipments, the most notable change, aside from the decrease on the Grand Trunk and the increase on the Chicago, St. Louis & Pittsburgh, is the unusually large share of the Baltimore & Ohio, which also has a sudden and great gain in provision shipments, indicating that the Baltimore steamers are not permitting the Montreal steamers to fill up at their expense. The Michigan Central's share is very small, but is larger than last week. It is the chief receiver of freight from junction points (Joliet and Matteson) now included in the pool, and what it has lost by the entrance of new lines has probably come wholly from the shipments from the Chicago stations, which are all that is included above.

At this time of year we should expect shipments from

Chicago to increase rather than decrease. For five years they have been for eight successive weeks:

Week to	1880.	1881.	1882.	1883.	1884.
Aug. 2	25,568	50,626	19,269	27,921	24,423
" 9	35,008	49,029	18,511	23,808	22,930
" 16	33,285	45,167	18,113	29,176	28,912
" 23	29,436	50,262	28,950	35,463	34,405
" 30	32,850	53,473	32,010	37,543	25,932
Sept. 6	33,237	53,948	30,087	40,994	27,285
" 13	31,260	45,276	39,812	49,624	25,000
" 20	33,844	56,094	35,611	48,254	25,000

Thus the receipts in no other year decreased after the third week in August, while last year they increased largely. The railroads are carrying an unusually small amount of grain from Chicago, and even the movement of the large spring-wheat crop is not likely to give the lines east of Chicago much to do, except in flour shipments, and there is some reason to suppose that an unusually large part of the flour manufactured at Minneapolis will be shipped by way of Lake Superior, until navigation closes.

Chicago, Burlington & Quincy Earnings in July.

The earnings of the Chicago, Burlington & Quincy Railroad in July were nearly 5 per cent. less than last year, and the smallest of the year since January, and no less than \$341,933 (16½ per cent.) less than in June. A decrease from June to July is not uncommon on this railroad, but it has never been so large before. Last year it was \$113,200, in 1881 \$195,500, but in 1880 there was an increase from June to July of \$90,700, and in 1882 one of \$187,300. July is too early for this road to feel the new crops much, but it is just the month for it to feel the poor crops of corn last year. It, however, fares better in this respect than most other Chicago railroads, because it carries most of the Nebraska crop, which was very good last year, and much of the Kansas crop, which was also very good. Actually its percentage of decrease in July was much less than the Northwestern's, which had a much larger increase of mileage, but larger than the Chicago & Alton's, which had no increase in mileage.

The net earnings of the Chicago, Burlington & Quincy decreased more than the gross earnings, for there was an increase of \$52,654 (5 per cent.) in the working expenses, which made the decrease of net earnings no less than \$142,171, or 18 per cent. The decrease in freight earnings was 7 per cent. and in miscellaneous earnings nearly 20 per cent.; but there was an increase of 5.7 per cent. in passenger earnings.

For the last five years the gross and net earnings and working expenses have been:

Year.	Miles.	Gross earnings.	Expenses.	Net earnings.
1880	2,597	\$1,773,043	\$740,392	\$1,032,651
1881	2,712	1,888,358	942,495	945,863
1882	3,168	1,925,006	873,820	1,051,186
1883	3,223	1,824,765	1,030,751	794,014
1884	3,264	1,735,199	1,092,405	642,794

Thus the gross earnings this year were smaller than in any other since the union with the Nebraska roads except 1882, while the expenses were larger than in any other year without exception, leaving the net earnings smaller than in any other July, 32 per cent. less than in 1881, and 37 per cent. less than in 1880—truly a great falling off in profits since these the last of two good corn years. The net earnings per mile have been:

Year.	1880.	1881.	1882.	1883.	1884.
\$	394	348	337	244	191

Thus the net earnings per mile were twice as great in 1880 as this year in July.

For the seven months ending with July, the earnings and expenses for this year and last have been:

	1884.	1883.	Inc. or Dec.	P. c.
Gross earnings	\$13,351,221	\$13,229,903	+	\$121,318 0.9
Expenses	7,549,457	7,063,406	+	486,051 6.9

Net earnings..... \$5,801,764 \$6,166,502 — \$364,738 5.9

There is a slight increase in gross earnings, but the increase in working expenses is so considerable that the net earnings are reduced nearly 6 per cent., which, however, is only about ½ per cent. on the capital stock outstanding.

The earnings and expenses of this road for the seven months ending with July, for the last five years, have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1880	\$11,433,248	\$5,307,117	\$6,036,131
1881	10,986,905	5,883,098	5,103,807
1882	10,781,121	6,139,423	4,641,698
1883	13,229,908	7,063,407	6,166,501
1884	13,351,220	7,549,456	5,801,764

The gross earnings were thus larger this year than ever before, but the increase in working expenses has been such that the net earnings are not only less than last year, but less also than in 1880, when the company was working 760 less miles of road. That was an entirely phenomenal year, however, the expenses having been but 47.2 per cent. of the earnings, while this year they were the more usual proportion of 56.5 per cent.

The increase in gross earnings for the seven months was due to passengers and to mails, express, etc. The freight earnings decreased \$181,840 (1½ per cent.), and this decrease was almost exactly balanced by an increase of \$184,120 (6½ per cent.) in passenger earnings. As the "miscellaneous earnings" are mostly from mails and express carried by passenger trains, we have a gain of \$303,153 (8.8 per cent.) in the earnings of these.

Great things are expected of this road next year, and, so far as crops are concerned, it is hard to see how the prospect could be more favorable. But the corn crop, which especially distinguishes this year from last, will not have much effect on the earnings before December, being felt only indirectly in the shipments of fat hogs through November, and the small grains were uniformly good on this road last year. Moreover, its earnings were very good, indeed, in every month after July last year, so that it will

be doing very well indeed if it does as well as last year in the remaining months. Owing to the general condition of business, it will not be strange if there should be a decrease until the new corn begins to come in, but after that there should be an increase, which may be very large.

The Wabash report to the Illinois Railroad Commissioners covering the business of the year ending June 30, shows that the net earnings lacked more than \$2,000,000 of meeting the fixed charges of the year, which it would require an assessment of 4 per cent. on the stock to pay. During the calendar year 1883 the deficit was \$2,346,952, in 1882 it was \$678,283, and in 1881 \$1,104,860. Very few companies have kept out of a Receiver's hands so long with such insufficient net earnings. Only borrowing to pay interest made it possible for the Wabash to keep out so long, and for a company which is not saving interest to borrow more money without any mortgage is, naturally, no easy task under ordinary circumstances. But the circumstances were extraordinary. The people who controlled the Wabash were loaded down, at least that is the common belief, with scores of millions of other stocks. If the Wabash had gone into a Receiver's hands immediately after the first deficit, after 1881, it would have been likely to bring prices down with a run, and the Wabash directors would have lost many millions. By advancing the money to pay the interest they postponed the catastrophe, and secured two years and a half of grace in which to "unload." The market for unloading has probably not been so favorable as was expected, but it is probable that those who advanced the money to pay the Wabash interest in 1882 and afterward have not lost by their action, especially as it may be that their loans may be paid quite as soon as those of some of those secured by mortgages on the company's property.

It seems that the term "Silver Palace Car" is no longer a hyperbolic phrase, but can now be used to describe a car which is absolutely covered with the precious metal. The London Engineer says:

"The Southeastern Railway Company has just turned out from its works at Ashford a new six-wheeled detachable composite carriage, the paneling of which is electro-plated, to avoid the expense of repainting. The vehicle is 32 ft. long, and consists of two first-class compartments 6 ft. 10 in. long, giving 58.88 cubic ft. of space per passenger; two second-class compartments, 6 ft. 3½ in. long, giving 40.25 cubic ft. of space per passenger; and a guard's compartment. The carriage is luxuriously fitted, and the interior, and, it is thought by some, the exterior, also have a very handsome appearance. The moldings are of sheet copper, stamped out under the press and electro-plated. In order to obtain greater strength, metal has been chiefly used in the construction of the carriage. All the pillars and roof sticks are of angle iron; the under frame is made entirely of iron, while riveting has been brought into use wherever practicable. The carriage is to be attached to the morning down mail from Charing Cross, and slipped at Shorncliffe."

The term "detachable carriage" refers to the practice of "slipping" the rear coach, which we believe is peculiar to English railroads. The coupling of the car or cars to be slipped are unfastened by a suitable apparatus on approaching a station and the car is brought to a stand at the platform, while the main part of the train, still attached to the engine, proceeds on its way at unabated speed. The use of metallic panels, generally of thin sheet iron, is very general on the continent of Europe, but in England papier mache has been the only substitute hitherto used for wooden paneling. The use of metal, of course, avoids any trouble from split panels, but it is heavy and noisy and makes a car hot in summer and cold in winter.

The "saving the expense of repainting" seems just a trifle far-fetched. After a few journeys through long tunnels the sulphur in the coal will probably tarnish the plating considerably and be very expensive to clean.

Both the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul had a decrease in earnings in the first week in September, when the new crops in Iowa at least ought to be coming forward quite freely. As they were large and did come forward quite freely at this time last year, perhaps no increase should be expected so early. The largest increase in production will be in Minnesota and Dakota, and we probably must wait a while longer before we hear from them. It is probable, however, that the decrease in earnings is not due so much to a lighter crop movement as to less activity in manufacturing, building and other industries, which possibly may fully offset the heavier crop movement which may confidently be expected soon in Minnesota and Dakota, and elsewhere after the corn is fit for market.

The price of wheat is now very low, but not so low as in some previous years. Before 1860, for instance, it was not uncommon for the price at Chicago to be 50 cents a bushel or thereabouts, and it was often hauled in wagons a hundred miles or more before this price could be had. It was a very unsatisfactory price, however, and under its influence Northern Illinois substantially abandoned wheat-growing, the average crop being light there. But even in 1866 the price fell as low as 70 cents a bushel in a greatly depreciated currency, worth just about 50 cents in gold. In 1869 the price fell to 76½ (about 64 cents gold), and in 1870 to 73 (65 cents gold) and in 1878 to 77, when currency was nearly par. Now Chicago quotations are about 77 again. Meanwhile the cost of transportation from Chicago to the seaboard has decreased immensely since the war, and largely since 1870, and there has also been a large decrease since 1873 in the freights for a distance of about 500 miles west, north-west and southwest of Chicago. Very little of the grain was grown further off than this before 1873, and for all this

country 77 cents at Chicago is a better price now than it was then. But the grain-growers are now producing large crops 200 to 250 miles west of Omaha and Kansas City and 400 miles and more northwest of St. Paul. Not far from 100 million bushels of wheat have been produced this year west of Minnesota and the Missouri, and most of it must be shipped to the East, because the population of the country producing it is so small that it will be able to consume but a small part of it. Thus the transportation question, which had become formidable in Iowa and Wisconsin about 1871, is now serious for the new country further west. The rates at which their crops are carried from Chicago and St. Louis to the seaboard are the wonder of the world; those from Missouri River points and St. Paul would be very low in any other country, but those on the lines further west are much higher, and must be if the roads are to have an adequate support, as the country is new and the traffic thin, and grain is a chief part of it. The charge from points in Nebraska about 250 miles west of Omaha to Chicago is about 45 cents per 100 lbs. of wheat = 27 cents a bushel, leaving but 50 cents for the man who buys at the farmer's station. This is better than to haul 100 miles to Chicago for the same price, but it is not satisfactory to farmers, and it is of the first importance to the railroads that the farmers' business should be profitable, otherwise the country will not grow and traffic will not increase. Reductions such as the Northern Pacific and the Manitoba have recently made on wheat shipments, while probably decreasing materially the net revenue of the current year, may greatly add to the profits in the following years. But it must be understood that there are limits beyond which grain cannot be grown profitably if it must be carried by rail. When wheat brings but 77 cents a bushel at Chicago these limits are much further east than when it brings a dollar, but when the price is so exceptionally low the railroads may have to help the farmers out to prevent an arrest in the growth of the country which they serve.

The low elevation of the outer rail on the New York, Pennsylvania & Ohio Railroad is not proving entirely satisfactory in the opinion of some of the road-masters, if we may judge from the discussion which took place at their last "roadmasters' meeting," an admirable institution, which Mr. Charles Latimer introduced some years ago and has kept up with very great advantage, we are sure, to the efficiency of his department. It was urgently suggested that the elevation should be increased from half an inch per degree to 1½ in. per degree, and although the plan was not adopted, yet it is an indication that the riding of cars at high speed over such low elevations is not entirely satisfactory, since Mr. Latimer himself has heretofore taken a very decided position in favor of the lower elevation. A practical advantage in the way of hauling more cars per train has been claimed, but it seems possible, at least, that much of the advantage ascribed to the low elevation is due to the general improvement of track which occurred simultaneously.

Lake rates have further advanced, 2½ cents per bushel for corn and 3 for wheat from Chicago to Buffalo, being late quotations; but canal rates have fallen off to 4½ for corn and 4½ for wheat from Buffalo to Chicago. Ocean rates are a little lower, at 2d. per bushel from New York by steam to Liverpool.

Record of New Railroad Construction.

This number of the Railroad Gazette contains information of the laying of track on new railroads as follows:

Cape Girardeau Southwestern.—Extended from Puxico, Mo., southward to Wappapello, 7 miles.

Deerfield River.—Track laid from Hoosac Tunnel, Mass., north 7 miles. Gauge, 3 ft.

St. Louis & San Francisco.—Track is laid on the Bolivar Branch from Springfield, Mo., northward to Buckley, 21 miles.

Sea Isle & Ocean City.—Extended north by east to Ocean City, N. J., 5 miles.

This is a total of 40 miles of new railroad, making 2,384 miles reported to date for the current year. The total track reported laid to the corresponding date for 13 years past is as follows:

	Miles.		Miles.
1884	2,384	1877	1,223
1883	3,584	1876	1,536
1882	3,584	1875	746
1881	6,940	1874	1,022
1880	4,235	1873	2,507
1879	3,288	1872	4,623
1878	1,863		
1873	1,273		

These statements include main track only, no account being taken of second tracks or other additional tracks or sidings.

The Philadelphia Electrical Exhibition.

This Exhibition is, unfortunately, still in a very incomplete state, few of the most important exhibits being ready, while many of the spaces are altogether unoccupied as yet. When all is in working order the Exhibition will doubtless be very interesting, especially to the users of electricity in its various applications. During the past year there has been a perceptible pause in the output of new discoveries and inventions in the field of electricity, and therefore the Exhibition will not interest the scientific as much as the practical man.

The Novelty Electric Company of Philadelphia exhibit a form of coupling between cars for electric wires used on railroad trains for either signaling or lighting. The act of uncoupling the wires to cut off a car short-circuits the current through the last car of the main part of the train. If the wires were used for electric lighting purposes, this ar-

rangement, with the assistance of small secondary batteries in each car would prevent any interruption to the illumination when a car was cut off, the current being then merely short-circuited. The same exhibitors also show an apparatus by which the ordinary bell cord will when pulled ring electric bells on any part of the train or on the engine. This apparatus will also sound an electric bell should the train part.

Another exhibit is an electric indicator, which shows the pilot whether the engines are going ahead or astern, or standing. He can thus see if his orders to the engineer have been understood. A large dial with a pointer is placed in the pilot-house, and the pointer is so connected with the reverse and throttle levers that it indicates their position, following the movement of either lever. We understand that this arrangement is largely used on steamers navigating Lake Erie.

The American Sectional Electric Underground Co. exhibited a large cast-iron pipe with a series of internal continuous copper wire trays, sliding on lugs cast on internal partitions in the main pipe. Insulated wires are laid on the trays, which, being flexible and continuous, can be readily removed through a man hole when required, permitting the cables to be examined.

It is not new to operate telephone or telegraph wires underground, but a satisfactory mechanical means of distributing them, or making connection with every house along a thoroughfare, has been the serious drawback to the enforcement of all the ordinances on the part of the public for the removal of overhead wires. We understand that the system has been used in both Philadelphia and Chicago.

The Washburn & Moen Manufacturing Co. shows a large number of samples of hard-drawn copper telegraph wire.

A large number of sawing machines are shown at work, the motive power being supplied by the Cleveland electric motor.

The New York Insulated Wire & Vulcanite Co. exhibited a large collection of wires coated with a new insulating material known as "okonite." It is claimed to have more resistance for a given thickness than any other known insulating material. It resembles a semi-hard vulcanized rubber, being black in color, and hard and pliable at the same time. The coated wire can be bent or twisted in any form without apparent injury. It is said to be proof against acids or alkalis and can be laid underground without loss of insulation, and it is reported to be durable and not liable to injury from abrasion or rough usage, and to resist either cold or heat; and it is certainly well tested in the latter respect at Philadelphia. It is largely used by the Union Switch & Signal Co., of Pittsburgh.

The company guarantees a resistance of 800 megohms in 1,000 yards length of No. 20 wire, and 80 megohms in the same length of No. 16 wire covered with this material.

Applegate's electric matting is a singular mode of giving warning of the approach of a burglar or other visitor. The matting proper is formed of a number of wooden slats hinged together by copper wire. These wires are normally disconnected, but a circuit is formed by the weight of the burglar's foot compressing a small brass spring on the under side of the matting. These springs are thickly placed, and could hardly be avoided by any person treading on the matting.

As the Brush, Edison, Weston and Thomson-Houston exhibits are not yet ready, we shall postpone any further account of the Exhibition, and would advise our readers to likewise postpone any intended visit to the Exhibition for at least ten days, when we believe that they will find much that is well worthy of a visit.

THE SCRAP HEAP.

Railroad Mail Exchanges.

A short time since, articles appeared in the Chicago and St. Louis papers describing the new exchanges established in those cities whereby the several railroads were sending their own and each others' mail matter to local destinations free of postage. The *Advertiser* ventured to remark that this was in violation of the prerogative of the United States government to carry the mails. Mr. De Pew, the St. Louis Post Commissioner, is reported as saying that when the article appeared in the *Globe-Democrat* there was nothing in it to object to; but when it was commented on by the Boston *Advertiser* and distorted, a false impression was given out. But Mr. De Pew was not kind enough to point out any respect in which the *Advertiser* distorted the law or the facts. In explanation of the object and methods of the exchange, he did, however, say: "The only difference between the Railway Mail Exchange and the old-style manner of handling railway mail is simply this: The 16 railroads send messengers to one place for their mail instead of allowing one man to make the circuit of the offices with the mail." He said that no private business was tolerated, and the United States laws permitted the railroads to carry their own mail.

On the contrary, General Edgarton, the United States post-office inspector at St. Louis, is reported by the *Globe-Democrat* as saying that he had no hesitation in pronouncing the exchange illegal. "Roads have a right," he said, "to transmit their mail when it relates to official business over their own line; but when they transmit that same matter over some other line they are violating the laws of the United States. I am satisfied the agents of the companies exceed their just right frequently in the transmission of correspondence between agents and employees when that correspondence is not in any sense official, or relating to the business of the road. The government expends annually immense sums of money for the transportation of mails over these roads, and when the latter endeavor to do any part of the business which belongs to the government, they infringe upon the prerogative of the Post Office Department and violate its laws. A furniture man endeavoring to establish a penny post here in St. Louis some time since, but we checked that tendency. In New York the express companies have somewhat exceeded their rights and privileges in carrying matter that should be confined to the mails; but, while that has been permitted, it is undoubtedly a violation of the law. A railway mail exchange, doing such a wide-spread and

large business, is a fraud upon the people, and takes large sums from the Post Office Department. Those engaged in it are criminal in the eyes of the law, and steps will be taken for the extinguishment of such an institution."—*Boston Advertiser*.

Tramps.

When the evening train on the New Haven & Derby Railroad stopped at West Haven, Conn., three men were found riding on the truck. The train hands dislodged them, and a fight took place, the tramps drawing revolvers and running the train to Derby, where two were arrested and one escaped. Some of the passengers narrowly escaped being struck by flying bullets. The police believe the men professional burglars, and suppose their intention was to rob the passengers.

Master Car-Painters' Association.

The Fifteenth Annual Convention of the Master Car-Painters' Association began in Boston Sept. 3, with about 70 members in attendance. The convention was called to order by the President, Mr. John Rattenbury, who made a short address congratulating the Association upon its continued prosperity.

The annual report of Secretary McKeon showed that there are now 95 active and 18 honorary members, an increase of 14 members during the past year. The receipts for the year amounted to \$386 and the expenditures to \$102, leaving a balance on hand of \$284.

The officers for the ensuing year were then chosen as follows: President, John Rattenbury, Chicago, Rock Island & Pacific, Chicago; First Vice-President, F. S. Ball, Pennsylvania Railroad, Altoona, Pa.; Second Vice-President, A. P. Sweet, Detroit, Lansing & Northern, Ionia, Mich.; Secretary and Treasurer, R. McKeon, New York, Pennsylvania & Ohio, Kent, O.

Committees were then appointed on the place for the next meeting, on resolutions and on the question of adopting the *Painters' Magazine* as the official organ of the Association.

Mr. D. D. Robertson of the Michigan Central then read a paper on "The Best Method of Testing Varnishes to secure the most satisfactory results as to their durability, with practical suggestions as to the time a car may safely remain in service before being taken in for revarnishing," which was followed by a discussion on the subject. The convention then adjourned until next day.

SECOND DAY.

The second day was principally devoted to the discussion of practical questions. The first question considered was: "What is the best plan for removing the old paint from the iron work of a locomotive and tank when necessary to be cleaned off to be ironed, and what is the best primer for iron?" The debate was opened by Mr. A. J. Bishop of the Cleveland, Columbus, Cincinnati & Indianapolis, who was followed by several speakers.

Mr. A. P. Stewart, Detroit, Lansing & Northern, read an interesting essay on the Antiquity of Painting.

An interesting subject which caused a long discussion was a paper read by Mr. C. E. Phelps (Southeastern, of Canada), on "Which gives the best results in wear and travel, an elastic or a hard drying color, on passenger cars?" A number of members spoke on this question, giving their own practice. After a long discussion it was finally voted "That it is the sense of the Master Car Painters at this meeting that the best results as to wear and durability are obtained by the use of semi-elastic color coats throughout in painting passenger cars."

Considerable discussion arose on the proper definition of "semi-elastic" coats, and finally, on motion of Mr. Stines, of the Barney & Smith Car Works, a "semi-elastic" coat was defined to be "one that dries in 24 hours with the temperature at not less than 55 degrees."

The session closed with the reading by the Secretary (McKeon, of the New York, Pennsylvania & Ohio Railroad) of "A Plea for Light Colors on Passenger Cars, or Economy in the Railway Paint Shop." The paper advanced strong arguments against the prevailing custom of painting cars in dark colors, urging, not only the increased first cost and the decreased wear resisting power, but the less cheerful appearance of a dark colored car.

In the afternoon members of the convention, many of whom were invited with their wives, joined in a trip to Nantasket Beach and a dinner at the Rockland House.

THIRD DAY.

On the third day of the convention considerable work was done and there was a full attendance of members. The first topic was "The relative merits of light and dark colors for passenger cars." After a short discussion the convention took up the "Various methods of cleansing painted and varnished surfaces." This called out a long discussion, a number of members giving their experience with the detergents ordinarily employed. The materials principally advocated were concentrated lye, mixed with a large proportion of soda or soap, various salts or pumice stone. In some special cases the peculiarities claimed were found to render other substances more valuable.

Reports of committees were then taken up. After some considerable discussion it was decided to adopt the *Painter's Magazine* as the official organ of the Association, a committee of three master car-painters to be appointed with the right to edit or supervise all the articles on car painting that may appear in the magazine.

The Committee on Resolutions presented the usual resolutions of thanks, which were unanimously passed, and the convention adjourned, closing an interesting and important session, in which the members attended very closely to business, although the proceedings were diversified with a very pleasant excursion.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Chicago & Eastern Illinois, annual meeting, at the office in Chicago, Oct. 7. Transfer books close Sept. 25.

Louisville & Nashville, annual meeting, at the office in Louisville, Ky., Oct. 1. Transfer books close Sept. 21.

Northern Pacific, annual meeting, at the office in New York, Sept. 18.

Western Union Telegraph, annual meeting, at the office in New York, Oct. 8.

Dividends.

Dividends have been declared as follows:

Lehigh Valley, 2 per cent., quarterly, payable Oct. 15, to stockholders of record on Sept. 18.

Missouri Pacific, 1½ per cent., quarterly, payable October 1. Transfer books close Sept. 20.

New York Central & Hudson River, 1½ per cent., quarterly, payable Oct. 15. Transfer books close Sept. 15. This company drops from 2 to 1½ per cent. on its quarterly dividend; the reduction has been generally expected.

Western Union Telegraph, 1½ per cent., quarterly, payable Oct. 15.

West Jersey, 3 per cent., semi-annual, in cash, payable Sept. 15. Last year the company paid 3 per cent. in cash and 3 per cent. in scrip.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

Association of American Railroad Superintendents, semi-annual meeting, in Boston, on Tuesday, Sept. 16.

National Association of General Passenger & Ticket Agents, semi-annual convention, in Boston, on Tuesday, Sept. 16.

Association of Railway Telegraph Superintendents, annual convention, in Philadelphia, on Wednesday, Sept. 17.

New England Railroad Club, first monthly meeting for the season, at the rooms in the Boston & Albany station in Boston, on Wednesday, Sept. 24.

New England Road-Masters' Association, annual convention, at White River Junction, Vt., on Wednesday, Oct. 8. A full programme and announcements were published in the number for Sept. 5.

General Time Convention, fall meeting, at the Continental Hotel, Philadelphia, on Thursday, Oct. 9.

Southern Time Convention, fall meeting, at No. 46 Bond street, New York, on Thursday, Sept. 18.

American Street Railway Association, annual convention, in New York, on Wednesday, Oct. 15.

Southern Time Convention.

In accordance with the request of the members of the Southern Railway Time Convention, notice is given that the fall meeting of the convention will be held at No. 46 Bond street, New York city, on Thursday, Sept. 18, at 11 a. m. This will supersede the meeting intended to be held on Oct. 15. A full attendance is specially desired at this meeting.

Trunk Line Meeting.

A meeting of trunk line representatives was held in Commissioner Fink's office, in New York, Sept. 5, Mr. Frank Thomson representing the Pennsylvania, Mr. King and Mr. Blanchard the Erie, Mr. Hayden the New York Central and Mr. Harriett the Baltimore & Ohio. The meeting was private, but it is said that no conclusions were reached at any point, although several matters of importance were discussed.

Association of Railway Telegraph Superintendents.

The Association of Railway Telegraph Superintendents will assemble at the Colonnade Hotel, in Philadelphia, for its annual meeting, at 2 p. m., on Wednesday, Sept. 17. A large representation of the association is expected, as the International Electrical Exhibition now in progress in Philadelphia will doubtless be of great interest to its members.

Mr. P. W. Drew is Secretary of the association, with office in Chicago.

Southern Railway & Steamship Association.

At the meeting of the Executive Committee of the Association in Louisville last week, the existing troubles, it is understood, were generally discussed. The meeting was held with closed doors, and no general account of the proceedings has been made public. It is stated, however, that the East Tennessee Co. consented to cancel its notice of withdrawal from the Macon and Atlanta cotton pools, and that some of the differences were amicably adjusted, while others were referred to the board of arbitration. No further action, it is probable, will be taken until the next general meeting of the Association.

American Institute of Mining Engineers.

The September meeting of the American Institute of Mining Engineers, held in Philadelphia last week, was largely auxiliary to the meeting of the American Association, the members of the Institute joining in a number of the meetings of the Association and in the entertainments given to that body. The Mining Engineers, however, found time to hold several meetings of their own, at which a number of interesting papers were read, and there was also some discussion, although the discussions were generally cut short by other demands upon the time of the members.

At the business session resolutions were adopted fixing the next meeting of the Institute in New York, in February, 1885. After the final adjournment of the Institute nearly all the members joined in an excursion to the anthracite coal regions, as arranged by the local committee.

ELECTIONS AND APPOINTMENTS.

American Society of Civil Engineers.—At the last monthly meeting of this Society, held in New York, Sept. 3, the following were elected members:

Members.—Henry Nash Babcock, New Haven, Conn.; George Herbert Boynton, Davenport, Ia.; George Hamilton Browne, Pittsburgh, Pa.; Moses Burpee, Milwaukee, Wis.; Frederick Armand Camp, Minneapolis, Minn.; Louis Prevost Evans, Pottstown, Pa.; Desmond Fitzgerald, Brookline, Mass.; Carl Gayler, St. Louis, Mo.; William Jackson, Boston, Mass.; Emil Kuichling, Rochester, N. Y.; Olin Henry Landreth, Tenn.; George Benjamin, New York City; George Edward Mann, Buffalo, N. Y.; John Jay McVean, Ionia, Mich.; Mansfield Merriman (elected Junior May 12, 1879), Bethlehem, Pa.; Edwin G. Nourse, Chicago, Ill.; Thomas Watson Orbison, Iron Mountain, Mich.; Oerlita Smith, Bridgeton, N. J.; Julio Federico Sorzano, New York City; Edward Bullinger Taylor, Pittsburgh, Pa.; Joseph Nelson Tubbs, Rochester, N. Y.; Robert Lawrence Van Sant, Memphis, Tenn.; Frederick Floyd Weld, Waterbury, Conn.

Associates.—Edward Buckingham Guthrie, Buffalo, N. Y.; Frank Herbert Howes, New York City; George Wellman Parsons, Harrisburg, Pa.

Junior.—George Alexander Just, New York city.

Anglesa.—Mr. J. Alfred Bodine, of Camden, N. J., has been appointed Receiver of this road.

Atlanta & West Point and Western Railway of Alabama.—The following circular from the office of General Manager Cecil Gabbet is dated Montgomery, Ala., Sept. 1:

"Mr. A. J. Orme is hereby appointed General Agent of these companies, with headquarters at Atlanta, Georgia, to take effect this day."

Mr. Orme was for 38 years connected with the Atlantic & West Point road, for nearly 20 years as General Freight and Passenger Agent.

Boston & Lowell.—The following circular from the office of Mr. J. K. Taylor, Superintendent of Rolling Stock and Machinery, is dated Concord, N. H., Sept. 1: "Mr. George A. Ferguson is appointed Master Mechanic of the White Mountain Division, to take effect this day."

Chicago & Atlantic.—At the annual meeting held Sept. 4 the following directors were chosen: H. J. Jewett, C. L. Atterbury, John King, Jr., Jacob H. Schiff, O. W. Childs, New York; George J. Bippus, Huntington, Ind.; T. A. Lewis, Indianapolis; J. M. Adams, Cleveland; C. C. Waite, Cincinnati. This road is controlled by the Erie.

Chicago, Burlington & Quincy.—At the last meeting of

the board, Mr. Thomas J. Potter, General Manager of the road, and heretofore Third Vice-President, was chosen First Vice-President.

Chicago, Milwaukee & St. Paul.—Mr. A. J. Earling, Assistant General Superintendent of this road, has issued the following order:

"Hereafter the Chicago & Council Bluffs Division will be divided at Savannah and operated in two divisions, viz: Chicago & Council Bluffs Division in Illinois, and Chicago & Council Bluffs Division in Iowa. P. B. Campbell is hereby relieved of the former, and G. O. Clinton is appointed Superintendent of the same, with office at Chicago. The above to take effect Aug. 31, 1884."

Cincinnati & Eastern.—At a meeting of the board in Cincinnati, Sept. 1, the following officers were elected: Henry Lewis, President; Milton Jamieson, Vice-President; William Mansfield, Secretary; H. B. Morehead, Treasurer.

Galveston, Harrisburg & San Antonio.—James Campbell, Superintendent of the El Paso Division of this road, with headquarters at El Paso, having resigned, General Superintendent Filmore has appointed C. B. Seymour, of the Colorado Division, to the vacancy, and given Mr. Seymour's place to E. E. Hewitt. J. A. Muir has been appointed Assistant Superintendent of the Rio Grande Division.

Hannibal Union Depot Co.—At a meeting of the board on Aug. 27, Messrs. John B. Carson and T. L. Dunn, of the Hannibal & St. Joseph, and H. P. Clark, of the Wabash, St. Louis & Pacific, resigned, and Messrs. J. F. Barnard and W. J. H. Hilton, of the Hannibal & St. Joseph, and E. N. Armstrong, of the Wabash, St. Louis & Pacific, were elected in their places. The directors elected the following officers: President, J. F. Barnard; Secretary and Treasurer, W. J. H. Hilton; Superintendent of depot and Ticket Agent, J. F. McDoel.

Kansas City, Clinton & Springfield.—The directors of this new company are to be as follows: George H. Nettleton, Wallace Pratt, L. W. Towne, J. S. Ford, J. H. Emmert, W. J. Ferry and W. E. Dunn, of Kansas City; A. C. Avery, of Clinton, Mo.; W. H. Barrett, of Harrisonville, Mo.

Missouri Pacific.—Circulars were sent out from the office of Third Vice-President Hoxie recently, announcing the following changes:

"The jurisdiction of A. M. Hager, Superintendent, is hereby extended over the Western Division of the Missouri Pacific Railway, including the branch to St. Joseph, Mo., with headquarters at Sedalia, as at present."

"W. W. Fagan will continue in charge of Central branch, Union Pacific Railroad, as Superintendent."

"George C. Knowlton is hereby appointed Assistant Superintendent of the Western division of this railway, with headquarters at Kansas City, Mo. He will have full charge of all trainmen and agents on that division."

"The jurisdiction of P. Rockwell, General Road-master, is hereby extended to include the Western Division of this railway, Kansas City to Papillion."

Official announcement has been made of the appointment (heretofore noted) of Mr. George J. Gould as Assistant President, with office in New York. He will perform such duties of the office of President as may be assigned to him.

Missouri Pacific.—Mr. T. S. Holmes has been appointed Train-Master of this road, with office at Houston, Tex. He had previously held the same position on the Minneapolis & St. Louis road, and also served on the Wabash and the Chicago, Burlington & Quincy as conductor.

Nashville, Chattanooga & St. Louis.—The board has elected Maj. J. W. Thomas, President, in place of Gov. J. D. Porter, resigned. Maj. Thomas will continue to act as General Manager also.

The board has elected Mr. E. B. Stahlman a director in place of C. C. Baldwin, resigned.

New York, West Shore & Buffalo.—Mr. E. V. Skinner has been appointed General Eastern Passenger Agent of this road, with office in New York, to date from Sept. 15.

Northern California.—The directors of this new company are: A. J. Binney, M. B. Langhorn, Nicholas Luning, N. B. Rideout, George Whittell. Office in San Francisco.

Pittsburgh & Western.—The following circular from Vice-President and General Manager Thomas M. King is dated Allegheny, Pa., Sept. 1: "Mr. J. Morton Hall has this day been appointed Superintendent of Express and Purchasing Agent of this company and leased lines, and will have special charge of these departments. Requisitions for supplies from heads of departments will be addressed to him direct."

Port Royal & Augusta.—A circular recently issued by President Raoul of this road says: "Mr. J. S. Davant having resigned the position of General Freight and Passenger Agent of this company, all communications relative to the business of the department will be addressed to Major W. F. Shellman, traffic manager, Savannah, Ga., who will assume its conduct till further notice."

St. Paul & Duluth.—The following circular has been issued by Superintendent Fisher: "Mr. G. F. Copeland has been appointed Train-Master, and will assume the duties of the office Sept. 1. Mr. F. McNaughton has been appointed Road-Master, commencing Sept. 1, and will have charge of the track between Rush City and Duluth, including the Knife Falls Branch. Mr. M. D. Kelly will continue as Road-Master between St. Paul and Rush City, including Minneapolis, Stillwater, Taylor's Falls, and Grantsburg branches."

Sioux Falls, Fairbank & Western.—The officers of this new road will be as follows: President, Judge C. A. Clark, of Osage, N. Y.; Vice-President, Bartlett Tripp, of Yankton, Dak.; Treasurer, C. F. Freeman, of Milwaukee; Chief Engineer and Superintendent, W. W. Walker, of Cedar Rapids, Ia.; Secretary, John D. Cameron, of Sioux Falls, Dak.

Toledo, Cincinnati & St. Louis.—Mr. J. E. Gimperling has been appointed Superintendent of the Dayton Division of this road, vice W. W. Cummings, resigned.

It is announced that Mr. C. E. Henderson will be appointed General Freight Agent of the above division. He is now Traveling Agent of the Indiana, Bloomington & Western road.

Western & Atlantic.—Mr. Joseph M. Brown has been appointed General Passenger Agent in place of Mr. B. W. Wrenn, resigned.

PERSONAL.

—Mr. Bennett H. Young has resigned his position as General Solicitor of the Louisville, New Albany & Chicago road.

—Mr. Russell Elliott has resigned his position as auditor of the Chicago & Atlantic Co., but his resignation has not yet been accepted.

—Mr. John L. Whalen has resigned his position as Traveling

Passenger Agent of the Louisville, New Albany & Chicago road and will, it is said, go to Minnesota.

—Col. G. J. Foreacre, General Manager of the Trans-Ohio Divisions of the Baltimore & Ohio Railroad, has been very dangerously ill at his residence in Newark, O., but is now recovering.

—Mr. George R. Blanchard, it is announced, has resigned his position as Vice-President of the New York, Lake Erie & Western Co., to take effect in November next. The cause of his resignation is not stated.

—Later dispatches confirm the report that Mr. J. A. Greer has resigned his position as General Freight Agent of the Michigan Central road, to take effect Sept. 30. The cause for this resignation is reported but no official statement has been made.

—It is reported that Mr. S. S. Merrill, now General Manager of the Chicago, Milwaukee & St. Paul road, will shortly be made Vice-President, and will be relieved from the active duties of the office of General Manager. Mr. Merrill's health is now much better than it has been for some time.

—Mr. Eustace C. Fitz has resigned his position as president of the New York & New England Railroad Co. Mr. Fitz has been a director of the company for a number of years but has been president only since Mr. Clark was appointed receiver and resigned the presidency in January last.

—Mr. B. W. Wren, for 16 years general Passenger and Ticket Agent of the Western & Atlantic Railroad and one of the most active and enterprising of Southern passenger men, has resigned his position, and it is understood that he will accept a similar position on the East Tennessee, Virginia & Georgia road.

—It is reported that Mr. Alexander Mackay, now General Freight Agent of the Chicago & Atlantic road, has been offered the position of General Freight Agent of the Michigan Central in place of Mr. J. A. Greer, resigned, but Mr. Mackay has not yet accepted and no official notice of the appointment has been made.

—Mr. Jacob B. Hovey has resigned the position of Superintendent of Motive Power and Machinery of the Rochester & Pittsburgh Railroad. Mr. Hovey has had long experience in charge of the motive power department of this and other roads. He is at present residing in Rochester, N. Y., but has not yet decided upon any future engagement.

—A report telegraphed from Cincinnati that Mr. John Scott had resigned his position as President of the Cincinnati, New Orleans & Texas Pacific Co. is denied by authority. It is said that Mr. Scott has asked for the appointment of a resident executive committee to relieve him of some of his responsibility and to represent the London stockholders.

—Mr. S. R. Callaway, now General Manager of the Union Pacific, has been presented by the officers and employees of his late road, the Chicago & Grand Trunk, with an address expressive of their esteem, their regard, and regret at parting with him. This address was accompanied with a handsome silver casket containing a paid-up life insurance policy for \$6,000.

—Mr. Samuel Schoch has resigned his position as General Manager of the Marquette, Houghton & Ontonagon road, to take effect Sept. 30. Mr. Schoch is suffering from nervous prostration, and his medical advisers have prescribed complete rest and a more southern climate. Mr. Schoch has been General Manager of the road for a number of years and before going to Michigan was Superintendent and Chief Engineer of the Morris & Essex Railroad for several years.

—Capt. J. N. Abbey, Passenger Agent of the Middle Division of the Pennsylvania Railroad, died Sept. 1, aged 45 years. Capt. Abbey has been with the Pennsylvania Railroad for several years and was previously Eastern Passenger Agent of the Cleveland, Columbus, Cincinnati & Indianapolis. He has been in failing health for several years but attended to his duties up to June last, when he was granted a three months' vacation, in the hope that the rest might improve his physical condition.

—Mr. Frank M. Baker, General Superintendent of the Addison & Northern Pennsylvania Railroad, was elected President of the New York State Fireman's Association at its last annual convention. On his return to his home in Owego, Mr. Baker was given a reception by his friends and neighbors. An address of welcome was delivered congratulating him on his record as a fireman. When only fourteen years old he organized an independent fire company, and has ever since belonged to some similar organization. He was one of the first to form the state association of which he is now the head.

TRAFFIC AND EARNINGS.

Grain Movement.

For the week ending Aug. 30, receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the last nine years:

Year.	North-western receipts.	Total.	By rail.		Atlantic receipts.
			P. c.	By rail.	
1870.....	4,240,764	4,598,884	1,808,411	43 1	3,612,266
1871.....	5,015,253	4,192,004	993,998	21 6	4,745,601
1872.....	8,462,587	6,005,490	1,316,419	19 9	6,846,950
1873.....	7,759,589	5,137,879	1,445,917	25 1	7,321,212
1874.....	6,677,269	6,323,361	2,132,350	33 7	6,337,127
1875.....	8,520,758	5,104,559	2,517,395	49 3	5,431,082
1876.....	8,060,410	5,393,641	2,745,645	50 9	6,810,121
1877.....	9,163,688	6,898,033	2,697,604	39 3	5,031,453
1878.....	7,127,224	5,298,481	1,893,990	35 6	4,555,713

Thus the receipts of the Northwestern markets for the week this year were smaller than in any corresponding week since 1877, except in 1880, and were 2,036,000 bushels less than last year; they were also 868,000 bushels less than in the previous week of this year, and 1,318,000 bushels less than in the week before that. The decrease from the previous week was almost wholly at Chicago and Toledo. Receipts at Duluth were still insignificant through this last week of August. It would not receive the new crop for some time later but for the fact that some Dakota farmers thresh from the field without stack just as soon as the wheat is dry enough, and sometimes have to ship directly for want of granaries.

The shipments of these markets for the week were 1,630,000 bushels less than in the corresponding week of last year, also much less than in 1878 and 1880, and a little less than in 1882. They were 253,000 bushels more than in the previous week of this year, and with two exceptions were the largest of the year. The rail shipments were smaller than in any corresponding week since 1879, and the smallest for three weeks. The shipments down the Mississippi were 108,810 bushels.

The Atlantic receipts for the week, though less than in any corresponding week since 1876, were much larger than in any other August week, and with one exception were the largest of the year. They were nearly one-fourth larger than in the previous week. The increase is distributed

among all the principal Eastern ports, New York receiving 56.2 per cent. of the whole, and Baltimore 17.2 per cent.

For this week to Aug. 30 the exports for five years have been:

	1880.	1881.	1882.	1883.	1884.
Flour, bbls.....	111,602	129,263	171,299	128,988	191,581
Grain, bu.....	6,097,814	3,322,468	4,118,707	2,535,688	3,140,566

Total, bu..... 7,200,023 3,904,751 4,886,477 3,116,134 4,002,680

Thus the exports this year were larger than last year on in 1881, but were 18 per cent. less than in 1882 and 44 per cent. less than in 1880.

San Francisco exports for the two months of the California crop year from July 1 to Aug. 30 were as follows, flour in barrels and wheat in bushels, flour being reduced to wheat in the totals:

	1884.	1883.	Inc. or Dec.	P. c.
Flour.....	136,131	143,575	D.	7.444
Wheat.....	2,444,112	2,335,020	I.	109,092

Total bushels..... 3,124,767 3,052,895 I. 71,872 2.3

Exports of California barley by sea for the two months of the crop year to Aug. 30 were 54,574 cwt., against 45,522 cwt. for the corresponding period last year; an increase of 9,052 cwt., or 19.9 per cent.

Railroad Earnings.

Earnings for various periods are reported as follows:

Eight months ending Aug. 31:				
	1884.	1883.	Inc. or Dec.	P. c.
Boston, Hoosac				
Tun. & W.....	\$281,458	\$214,063	I.	\$67,395 31.5
Bur. C. R. & N.....	1,091,303	1,709,368	D.	18,065 1.1
Canadian Pacific.....	3,361,832	3,251,226	I.	110,606 3.4
Central Iowa.....	883,030	869,127	D.	16,907 1.8
Central Pacific.....	14,421,020	15,863,341	D.	1,441,421 9.0
Chi. & Alton.....	5,449,559	5,423,639	I.	25,920 0.4
Chi. & East. Ill.....	973,711	1,060,061	D.	82,350 8.7
Chi. & St. P., Min.				
& O.....	3,580,544	2,303,257	I.	277,287 8.4
Det. Lan. & No.....	802,175	1,018,658	D.	26,483 1.3
Long Island.....	1,881,853	1,896,333	I.	15,220 0.8
Louisv. & Nash.....	8,720,313	8,712,938	I.	7,375 0.1
Mil. L. S. & W.....	716,098	604,034	I.	52,064 7.7
Mobile & Ohio.....	1,243,832	1,254,194	D.	10,362 0.8
Northern Pac.....	7,981,595	5,424,907	I.	2,556,688 43.4
Roch. & Pitts.....	739,345	540,363	I.	198,982 17.3
St. P. & Duluth.....	736,496	792,588	D.	56,092 7.0
St. P., M. & Man.....	4,823,950	5,154,921	D.	330,971 6.4

Seven months ending July 31:				
	1884.	1883.	Inc. or Dec.	P. c.
Atch. T. & S. F.....	\$8,048,454	\$8,694,704	I.	\$253,750 2.9
Net earnings.....	4,019,713	4,493,680	D.	473,967 10.6
Ches. & Ohio.....	2,032,144	2,132,067	D.	99,923 4.7
Net earnings.....	560,811	663,398	D.	102,587 15.5
Ches. O. & S. W.....	719,645	659,722	I.	59,923 9.1
Net earnings.....	119,314	107,459	I.	11,855 11.0
Chi. Bur. & Q.....	13,351,220	13,229,668	I.	121,552 0.9
Net earnings.....	5,801,794	6,166,501	D.	364,707 5.9
Eliz. Lex. & B. S.....	397,817	380,062	I.	17,755 4.7
Net earnings.....	107,718	80,255	I.	18,463 20.5
Kentucky Cent.....	472,762	426,560	I.	46,202 10.8
Net earnings.....	146,033	163,649	D.	17,616 10.7
N. Y. L. Erie & W.....	11,256,151	12,278,919	D.	1,022,768 8.3
Net earnings.....	1,077,717	3,377,914	D.	1,400,197 41.4

Month of July:				
	1884.	1883.	Inc. or Dec.	P. c.
Atch. T. & S. F.....	\$1,311,630	\$1,325,710	D.	\$14,071 1.8
Net earnings.....	483,779	768,063	D.	284,284 37.0
Ches. & Ohio.....	335,308	333,132	D.	14,570 4.2
Net earnings.....	116,487	127,035	D.	11,148 8.7
Ches. O. & S. W.....	108,671	106,584	I.	2,087 1.9
Net earnings.....	34,347	29,915	I.	4,432 14.8
Chi. Bur. & Q.....	1,755,199	1,824,705	D.	69,506 4.9
Net earnings.....	642,794	784,954	D.	142,160 18.1
Eliz. Lex. & B. S.....	74,856	63,435	I.	11,421 18.0
Net earnings.....	32,498	29,123	I.	3,375 11.6
Kentucky Cent.....	95,593	80,730	I.	14,863 15.9
Net earnings.....	34,347	40,870	D.	6,523 19.9
N. Y. L. Erie & W.....	1,794,639	2,111,456	D.	326,817 15.5
Net earnings.....	441,303	616,773	D.	175,470 28.5

Month of August:				
	1884.	1883.	Inc. or Dec.	P. c.
Boston, Hoosac				
Tun. & W.....	\$47,259	\$34,485	I.	\$12,774 37.0
Bur. C. R. & N.....	216,590	232,521	D.	15,931 6.8
Canadian Pacific.....	585,000	591,000	D.	6,000 1.0
Central Iowa.....	119,822	120,353	D.	531 0.4
Central Pacific.....	2,138,900	2,138,000	D.	144,000 6.3
Chi. & Alton.....	859,083	886,556	D.	27,473 3.1
Chi. & East. Ill.....	146,906	158,031	D.	11,125 7.0
Chi. St. P., M. & O.....	418,417	480,400	D.	61,983 6.6
Det. Lan. & No.....	115,238	152,348	D.	37,110 24.4
Long Island.....	386,461	394,007	D.	7,546 1.9
Louisv. & Nash.....	1,123,060	1,242,827	D.	119,767 9.6
Mil. L. S. & W.....	95,094	96,200	D.	1,106 1.1
Mobile & Ohio.....	142,354	156,584	D.	14,230 9.9
No. Pacific.....	1,016,896	1,043,624	D.	26,728 2.6
Roch. & Pitts.....	110,306	60,009	I.	49,297 85.2
St. P. & Duluth.....	123,988	140,567	D.	16,579 11.8
St. P., M. & Man.....	564,421	620,613	D.	56,192 10.3

Weekly earnings are usually estimated in part, and are subject to correction by later statements.

Coal.

Anthracite coal tonnage for the eight months ending Aug. 30, as given by the weekly reports of the companies, were as follows, the tonnage in each case being only that originating on the line to which it is credited:

	1884.	1883.	Inc. or Dec.	P. c.
Phila. & Reading	6,395,581	6,951,840	D.	556,259 8.0
No. Cent., Shamokin Div	604,162	797,705	D.	133,543 16.7
Sun. Hazleton & W. B.	198,596	100,231	I.	98,365 98.2
North & West Branch.....	615,102	328,975	I.	286,127 97.0
Pennsylvania Canal.....	250,581	282,067	D.	31,486 12.5
Pennsylvania & N. Y.	146,506	137,562	I.	8,944 6.5
Lehigh Valley.....	3,336,154	4,121,101	D.	284,947 9.0
Del. Lacka. & Western.....	3,269,985	3,199,182	I.	70,803 2.2
Del. & Hudson Canal Co	2,455,427	2,533,162	D.	77,735 3.1
Pennsylvania Coal Co.....	831,379	918,238	D.	86,859 9.5
State Line & Sullivan.....	43,411	41,540	I.	1,871 4.5
Total anthracite.....	18,708,854	19,411,623	D.	704,769 3.6

gains in tonnage, tending to support the claims of the operators that their coal is to a considerable extent supplanting anthracite for steam and factory purposes in the Eastern States. The gas coals of Western Pennsylvania show a decrease, and losses are also reported in several of the smaller districts, which are chiefly or largely dependent upon iron furnaces and rolling mills for their market. One new line appears in the table, the Keating & Karthaus, which is a branch of the Pennsylvania Railroad in the Snow Shoe District.

Coke tonnages for the eight months ending Aug. 20 are reported as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Bellefonte & Snow Shoe.....	15,452	12,675	I. 2,777	21.9
Mountain District, Pa. R. R.....	87,591	56,131	I. 31,460	56.2
West Penna. R. R.....	24,865	69,416	D. 44,551	64.0
Southwest Penna. R. R.....	1,488,380	1,393,821	I. 94,559	6.7
Penn and Westmoreland.....	137,637	147,630	D. 10,000	7.2
Monongahela Div., Pa. R. R.....	51,990	396,288	D. 112,180	28.3
Connellsville, via Pa. R. R.....	232,118			

Total coke..... 2,373,334 2,075,967 D. 38,634 1.9

These tonnages are all over the Pennsylvania Railroad and branches, the greater part coming from the Connellsville District.

The coal tonnage of the Pennsylvania Railroad Division, Pennsylvania Railroad, for the eight months ending Aug. 30 was:

	1884.	1883.	Inc. or Dec.	P. c.
Coal.....	6,697,933	5,834,139	I. 863,794	14.8
Coke.....	2,032,880	2,075,967	D. 53,087	2.6

Total..... 8,730,813 7,910,106 I. 810,707 10.2

This includes all tonnage passing over the road, whether originating on the line or received by it from other roads. The increase in tonnage this year is remarkable, especially in the present depressed condition of the iron trade, upon which the bituminous trade is dependent to a considerable extent for a market.

Cumberland coal shipments for the week ending Sept. 6 were 49,054 tons. The total shipments this year to Sept. 6 were 1,887,570 tons, against 1,676,614 tons for the corresponding period last year, an increase of 210,956 tons, or 12.6 per cent.

Cumberland coal tonnages for the eight months ending Aug. 30 are reported by the Cumberland Civilian as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Shipments from mines.....	1,193,022	1,060,706	I. 132,316	12.5
Cummers Creek & Cum.....	348,688	343,532	I. 5,156	1.5
West Va. Central & Pitts.....	295,766	206,021	I. 89,745	43.6
Direct to B. & O.....	1,039	2,546	D. 1,507	59.2

Total..... 1,838,515 1,612,805 I. 225,710 14.0

Shipments out of region: Balt. & O. R. R..... 1,378,254 899,470 I. 478,784 53.2 Bedford Div., Pa. R. R..... 258,183 292,908 D. 34,725 11.9 Ches. & Ohio Canal..... 202,078 420,427 D. 218,349 52.0

Total..... 1,838,515 1,612,805 I. 225,710 14.0

The changes in shipments are notable. Local deliveries are included in the Baltimore & Ohio tonnage.

Actual tonnage passing over the Pennsylvania & New York road for the nine months of its fiscal year, from Dec. 1 to Aug. 30, was:

	1884.	1883.	Inc. or Dec.	P. c.
Anthracite.....	966,476	867,534	I. 98,942	11.4
Bituminous.....	229,787	242,006	D. 12,219	5.1

Total..... 1,196,263 1,109,540 I. 86,723 7.8

The larger part of the anthracite comes from the Lehigh Valley road, of which this line is an extension.

Cotton.

A dispatch from New Orleans gives the following statement (in bales) of the cotton crop of the United States for the year ending Sept. 1, as made up by the National Cotton Exchange:

	1883-4.	1882-3.
Net port receipts.....	4,800,554	6,009,612
Exports to Great Britain.....	2,464,896	2,885,904
Exports to France.....	468,996	438,808
Exports to Continent and Channel.....	962,749	1,399,332
Total exports.....	3,916,581	4,724,044
Overland direct to Northern mills.....	561,580	641,801
Total shipments overland.....	989,280	1,178,560
Of which to Northern ports.....	370,520	508,894
Total crop.....	5,713,300	6,949,756
Takings of Northern spinners.....	1,537,166	1,759,703
Takings of Southern spinners.....	349,517	313,393

Total consumption of the United States. 1,876,683 2,073,096
Sea Island crop..... 35,490 36,709
Stock at all ports..... 126,721 235,484
Average weight of bales in pounds..... 482.64 480.85
Shipped to Canada..... 22,052 42,553

The total crop for last year, as given by this statement, shows a decrease of 1,236,556 bales, or 17.8 per cent. The decrease in the exports was 807,463 bales, or 17.1 per cent.; in the United States consumption, 196,413 bales, or 9.5 per cent. The stock on hand at the seaports at the close of the year shows a decrease of 108,763 bales, or 46 per cent.

The movement for the five days of the new crop year to Sept. 5 was as follows, in bales:

	1884.	1883.	Inc. or Dec.	P. c.
Receipts.....	7,388	23,308	D. 15,920	68.3
Shipments.....	9,271	20,053	D. 10,782	53.8
Stock, Sept. 5.....	16,884	53,576	D. 36,692	68.3
Seaports:				
Receipts.....	15,101	33,308	D. 18,207	54.7
Exports.....	16,990	23,911	D. 6,921	28.8
Stock, Sept. 5.....	111,205	211,878	D. 100,673	47.5

Actual movement from plantations for the week was 16,859 bales. Estimates of the new crop, while differing considerably, do not put it above that of the year just closed.

RAILROAD LAW.

Taxing Sleeping Cars in Illinois.

In Springfield, Ill., Sept. 4, the Attorney-General of Illinois rendered a decision in answer to a question from the State Board of Equalization in relation to assessing sleeping cars. The Attorney-General holds that under the present law when sleeping cars are run and operated by railroad companies they should be listed by the company operating them and assessed to that company by the State Board, but when the cars are operated for the benefit of the sleeping-car company, and simply hauled by the railroad company, they should be assessed the same as the property of an express company, by local assessment, and must be assessed at the principal office of the sleeping-car company if in the state, or otherwise in the place where the cars are usually kept when not running.

Right of Way—Measure of Damages.

In the case of King and another against the Minneapolis Union Co., the Minnesota Supreme Court holds as follows: 1. When property is taken for public uses, the owner is entitled to its market value for the use to which it may be

most advantageously applied, and for which it would sell for the highest price in the market.

2. Any evidence is competent, and any fact is proper to be considered, which legitimately bears upon the market value of the property.

3. Where the property has been improved for a special purpose for which it is especially suited (as in this case, for the manufacture of plows), if the fact that the business has been thereon established and in operation has enhanced the market value of the property as a site for carrying on such business, it is proper to take this fact into consideration.

OLD AND NEW ROADS.

Anglesea.—The New Jersey Court of Chancery has granted the petition of certain creditors of this company and has appointed a receiver for the road. It is a short line running from the West Jersey Railroad to Anglesea near Cape May, and was completed only a few months ago.

Bellaire, Zanesville & Cincinnati.—A meeting of the stockholders of this company has been called, to be held at Woodville, O., Oct. 1, for the purpose of voting upon the proposed issue of \$200,000 in 6 per cent. income bonds, for the purpose of funding the floating debt and relieving the company from its present embarrassments.

It is reported that negotiations are in progress for the transfer of a controlling interest in this road to the Baltimore & Ohio Co. The road is a narrow-gauge line running from Bellaire, O., by a somewhat roundabout route to Zanesville. The company has been for some time in embarrassed circumstances.

Boston & Lowell.—At a special meeting of the stockholders held in Boston, Sept. 4, it was unanimously voted that the directors be authorized to build a branch from North Billerica, Mass., to Bedford, also to locate and construct a branch railroad from the terminus of the Woburn branch to Wilmington. In order to build these branches the directors are authorized to increase the capital stock to a sufficient amount to provide for the cost of construction, which is estimated at about \$150,000. The branch from North Billerica to Bedford will be substantially on the line of the old Billerica & Bedford narrow-gauge road which was abandoned several years ago.

Brooklyn & Rockaway.—Surveys have been made for a line to run from the proposed terminus of the Brooklyn Elevated Railroad in East New York along the shore of Jamaica Bay to Far Rockaway, a distance of about 10 miles. Most of the property owners along the proposed line are willing to give the right of way, and to assist as far as possible in construction. The projectors announce their intention of having the road completed in time for the next summer's business.

Canton & Massillon.—It is proposed to build a railroad from Canton, O., via Meyer's Lake to Massillon, a distance of about eight miles. Meyer's Lake is quite a summer resort for both cities.

Cape Girardeau Southwestern.—This road is now completed from Cape Girardeau, Mo., to Wappapello on the St. Francois River in Wayne County. This is an extension of seven miles built during the present year. Trains commenced to run through to the new terminus Sept. 1, having previously run to Puxico, 45 miles from Cape Girardeau.

Central Massachusetts.—The Boston Herald says: "The stockholders have been invited to subscribe to a loan (of \$1,500,000 new 6 per cent. bonds), and, should they avail themselves of the privilege, the subscription would be accepted. But there is neither a probability nor expectation that they will do anything of the kind, although a willingness has been shown to take a few thousand dollars' worth of such bonds. The invitation to subscribe was sent to the shareholders more as a matter of form than for anything else. The management has not a remote hope of completing the road at present on any such subscription. It is rather giving attention to the offers of contractors to complete the road and take bonds in payment. Contractors are looking over the road nearly every week for this purpose, and should a reasonable one be found who is willing to take the bonds at a reasonable price, judged from the standpoint of the managers, a contract to finish the road will probably be let. There is hope that it will be let before the middle of October. There was some talk of a lease to the Fitchburg road on condition that the road be completed, but Fitchburg people were unwilling to pay the rental asked by the Central Massachusetts management, and nothing has come of negotiations to date."

Chicago, Burlington & Quincy.—This company's statement for July and the seven months ending July 31 is as follows:

	1884—July	1883—	1884—	1883—
Earnings.....	\$1,735,196	\$1,824,705	\$13,351,220	\$13,229,908
Expenses.....	1,092,405	1,039,751	7,549,456	7,063,407
Net earnings.....	\$642,794	\$784,954	\$5,801,764	\$6,166,501
Per cent. of exps.....	63.0	57.0	56.6	53.4

For the seven months the gross earnings increased \$121,312, or 0.9 per cent., while the expenses increased \$486,049, or 6.9 per cent., the result being a decrease of \$364,737, or 5.8 per cent., in net earnings.

Chicago & Great Southern.—For several weeks past no trains have been run over this road, which extends from Fair Oaks, Ind., on the Louisville, New Albany & Chicago, to Yeddo, 80 miles. The cause of the suspension has been lack of money to pay the employees. Arrangements, however, have now been made and the money secured to pay all back wages due, and train service was to be resumed on Sept. 10. It is possible, however, that there may be some delay, as nearly all of the men employed have gone to other roads and a new force must be collected.

Cincinnati, New Orleans & Texas Pacific.—This company's contract with Pullman's Palace Car Co., having expired in July, a new contract has been made with the Maun Boudoir Car Co. for the use of the Maun cars over the line. The contract is an exclusive one and is for 15 years. As soon as possible 30 new Maun cars will be placed on the road.

Cleveland, Columbus, Cincinnati & Indianapolis.—This company suffered a serious loss by the great fire in Cleveland on the night of Sept. 7. The loss includes the destruction of a bridge, several buildings and a number of loaded heavy freight cars. The track of the road was also practically destroyed for a considerable distance by the intense heat from the lumber yards adjoining the track, the ties being burned up and the rails twisted out of shape.

During the month of August 11.5 miles additional on the Indianapolis & St. Louis Division was ballasted with gravel, leaving about 17 miles unballasted between Indianapolis and East St. Louis, and this distance it is expected to complete this fall. It is the intention to ballast heavily with broken stone the 20 miles of track from St. Louis eastward running through the low grounds. This section is now ballasted with gravel, but some difficulty has been experienced from it washing out in heavy rains.

Deerfield River.—The track on this road is now laid from Hoosac Tunnel, Mass., the point of junction with the Troy & Greenfield road, northward along the east side of the Deerfield River for seven miles. Work is in progress to Readsboro, Vt., four miles from the present end of the track and 11 miles from Hoosac Tunnel, and the road will probably be completed this year. It is built by the Deerfield River Co. to reach its wood-pulp mills at Readsboro, and will be used chiefly for the transportation of the wood pulp from the mills and for hauling material to them.

Denver & Rio Grande.—Some discussion has already taken place on plans for the reorganization of this company. One of the plans suggested it is said provides for the consolidation of the Denver & Rio Grande Western with the Denver & Rio Grande and the conversion of all the liabilities of both companies into consolidated 5 per cent. bonds. It is also proposed to assess the stock in order to clear off the present floating debt. Nothing definite has been decided upon, however, and probably will not be for some time.

East Alabama.—All the rolling stock and other property of this company has been attached under judgments obtained against the company by Hugh Carlisle and the Catosa Navigation Co. in a suit for breach of contract. It is said that the running of trains will not be interfered with. The road extends from Opelika, Ala., to Buffalo, 22 miles.

East Tennessee, Virginia & Georgia.—For some time past there has been dissatisfaction among the locomotive engineers on this road in consequence of a readjustment of wages which, it was claimed, raised the wages of some of the engineers and reduced that of others in an unfair manner. A committee was sent to Knoxville to present the grievances to General Superintendent O'Brien and if possible to obtain an amicable settlement. After some delay a conference was held and the grievances of the engineers were presented. After a prolonged discussion the Superintendent and the committee reached an agreement under which the passenger engineers are to be paid at the rate of three cents per mile and freight engineers four cents, engineers on yard engines and work trains to receive \$2.50 per day. This was satisfactory to the engineers and was accepted by the General Superintendent.

Fitchburg.—The gap in the second track between Orange, Mass., and Wendell, has been filled, and trains are now using the double track from Boston to the Connecticut River. Work has been begun on the easterly pier of the new bridge over the Connecticut. The foundation for this pier requires that the rock shall be blasted out in order to make a level surface for the masonry. The only bridge unfinished on the improved line is that over Miller's Creek, where trains will use a temporary structure until the new iron bridge is built.

Florida Railway & Navigation Co.—It is announced that this company has acquired control of the De Bary-Baya steamboat line, which is operated extensively in Florida waters. The steamboat line will be continued under the organization of the De Bary-Baya line, and will have a fleet of 17 vessels, four running between Fernandina and Savannah, and the remaining 13 on the St. John's River. The arrangement it is expected will work advantageously for both parties, doing away practically with all competition.

Georgia Marble Co.—Contracts for the construction of this company's narrow-gauge line from Tate Station, Ga., on the Marietta & North Georgia road, to Tate Quarry, a distance of 2.25 miles, have been let to S. C. Tate, of Pickens, Ga., who is to do the bridging and supply the ties, the grading being done by a contracting firm from Birmingham, Ala. The road will be narrow gauge, and will connect the company's principal quarry with the Marietta & North Georgia road. It will be further extended hereafter to other quarries owned by the company.

Grafton, Buckhannon & Charleston.—This company has filed articles of incorporation to build a railroad from Phillips, W. Va., through Upshur, Webster, Braxton and Clay counties, crossing the great coal and timber belts of the state, and running through a region now entirely without railroad facilities. The incorporators are R. T. Devries, of Wheeling; W. M. Clements, of Baltimore; John Bradshaw, G. M. Whitesharver, and W. Mason, of Grafton, all Baltimore & Ohio men.

Illinois Central.—The following statement has been published for the half-year ending June 30:

Net earnings from operation.....	\$1,946,297
Land department.....	38,487
Miscellaneous receipts.....	118,562
Total.....	\$2,143,376
Interest and rentals.....	\$1,029,256
Other expenditures.....	48,817
Dividend, 4 per cent.....	1,160,000
Total.....	2,238,073

Deficit for the half year..... \$85,717
Surplus, Jan. 1, 1884..... 156,909

Surplus, June 30..... \$71,192

The rental charge is that of the Southern Division, the rental of the Iowa lines being included in expenses, and deducted before stating the net earnings above.

Lake Shore & Michigan Southern.—Among recent improvements on this road are a trestle 160 ft. long for the storage of 135,000 tons of iron ore, built at Ashtabula Harbor, and also carriers for unloading ore from vessels to cars. Two bridges between Ligonier and Millersburg, Ind., have been rebuilt with masonry, each being about 154 ft. long. At Jefferson, 163 ft. of trestle, 42 ft. high, is being built, and also 264 ft. of trestle, 30 ft. high, at Williamsfield, on the Mahoning Branch. The ice breakers above the bridge across the Maumee, at Toledo, have been incased in iron.

Louisville, New Orleans & Texas Pacific.—The last rail on this road was laid Sept. 5, at a point about 140 miles north of Vicksburg, the gap of fifteen miles between the line from Memphis southward and that from Vicksburg northward being then finished. This completes the entire line of 455 miles from New Orleans northward to Memphis and, in connection with the Chesapeake, Ohio & Southwestern road, a new through line from Louisville to New Orleans. The date of the opening of the road is not fixed, as there is some ballasting and finishing work still to be completed.

The new road, which was projected a number of years ago but is only now completed, runs from Memphis southward to New Orleans generally parallel with the Mississippi River and in most places within a few miles of it. While it will, of course, compete with the Illinois Central for through New Orleans business, it is generally too far west of that road to interfere very much with its local traffic, and the local business which it acquires will probably come rather from the river than from any other railroad. The road is controlled by Mr. C. F. Huntington, of New York, and his associates, and completes a line in their control from El Paso, Tex., to Newport News by way of Memphis, Louisville, and the Chesapeake & Ohio road. Its connection at El Paso is of course with the Southern Pacific, of which Mr.

Huntington is one of the chief managers, so that he may be said now to control a complete line from San Francisco to the Atlantic coast.

An agreement has finally been completed for the settlement of the controversy between this company and the city of Vicksburg. The agreement provides for the surrender to the company of the city stock in the old Mississippi Valley & Ship Island road, issued in 1872. The city is also to renounce all claims upon which it has instituted suits against the company, to exempt the property of the company from taxation for 99 years, and to convey to the company certain lands for depot purposes, and to close such streets as may be required to make those lands available. It is also agreed that the county shall vote \$150,000 in bonds, to be exchanged for stock of this company. On the other hand the company agrees on its part to withdraw all suits against the city; to locate its principal repair shops in Vicksburg, and to surrender all claim to the \$10,000 in bonds voted in 1878.

Mexican National.—The earnings of this company's Northern Division for the quarter ending June 30, 1884, amounted to \$157,612 gross, and \$38,790 net. For the Southern Division the gross income was \$197,121, and the net \$6,763, making the total gross \$354,733, and the total net \$45,553. On the Northern Division there are 472 miles in operation, and on the Southern Division 358 miles, making a total of 830 miles.

Minneapolis & Pacific.—This company has filed articles of incorporation in Minnesota to build a railroad from Minneapolis northwest to some point on the Red River, not yet designated. The principal office will be in Minneapolis. The capital stock is placed at \$5,000,000, and the incorporators are Messrs. Henry T. Welles, William D. Washburn, Clinton Morrison, John Martin, Thomas Lowry, Jacob K. Sidle and John C. Oswald.

Morris & Southwestern.—This company has filed articles of incorporation in Minnesota to build a railroad from Morris, Minn., southwest to a point on the Union Pacific road near Columbus, Neb. The principal office of the company will be in Duluth, Minn. The capital stock is placed at \$10,000,000 and the incorporators are A. J. Sawyer, A. M. Miller, J. C. Hunter and W. W. Spalding, of Duluth, and W. D. Cornish, Crawford Livingston and Harlan P. Hall, of St. Paul.

Nantasket.—This company, which runs a suburban line to Nantasket Beach, near Boston, has given notice that the trains on this road will be withdrawn for the winter on Sept. 15. The permanent residents along the line threaten an appeal to the Railroad Commission to compel the company to run trains through the winter. The travel on the line in winter would be small, as its principal business is in pleasure travel to the sea beaches.

New York Central & Hudson River.—On its October quarterly dividend this company drops from 2 to 1½ per cent. Some reduction in the dividend had been looked for, and the effect on the stock has been comparatively slight.

From the quarterly statements to the Railroad Commission the following table has been prepared showing the unfunded debt of the company on Dec. 31 and on June 30 last:

Cash Liabilities.			
	Dec. 31, '83.	June 30, '84	
Unpaid interest and dividends.....	\$53,757	52,246	
Wages, supplies, etc.....	2,892,508	3,035,051	
Due other roads.....	1,481,285	1,739,993	
Loans.....		3,000,000	
Totals.....	\$4,757,550	\$7,827,290	
Cash Assets.			
	Dec. 31, '83.	June 30, '84	
Cash on hand.....	\$225,117	\$1,252,076	
Due from agents and others.....	2,480,363	2,447,340	
Sundries.....	429,354	689,992	
Totals.....	\$3,213,834	\$4,389,408	
Net unfunded debt.....	\$1,543,716	\$3,437,882	

This statement, however, does not take into account interest and rentals accrued but not yet due, nor dividends declared but not yet paid. If to the net unfunded debt on June 30 be added accrued interest on the consolidated bonds, the Harlem dividend due July 1 (part of the rental of that road) and the Central dividend payable July 15, the amount of the liabilities over cash assets on that date would be increased to \$6,927,368 in all.

New York, Lake Erie & Western.—This company's statement for July and the ten months of its fiscal year, from Oct. 1 to July 31, is as follows, the gross earnings including 68 per cent. of the gross earnings of the leased New York, Pennsylvania & Ohio road, and all the working expenses of that line:

	July	1883	1882-83	1881-82
Earnings.....	\$1,784,639	\$2,111,456	\$17,671,846	\$17,678,157
Expenses.....	1,343,336	1,494,983	13,921,341	12,387,970
Net earnings..	\$441,303	\$616,473	\$3,750,505	\$5,290,187
The increase in gross earnings for the ten months was \$63,689, or 0.4 per cent., and the increase in expenses was \$1,533,371, or 12.4 per cent., the result being a decrease of \$1,469,682, or 8.2 per cent., in net earnings. The New York, Pennsylvania & Ohio was operated for the whole period this year, but only from May 1 last year.				
The earnings of the Erie lines proper, excluding all earnings and expenses of the New York, Pennsylvania & Ohio, were as follows:				
	July	1883	1882-83	1881-82
Earnings.....	\$1,458,189	\$1,694,687	\$14,351,811	\$16,401,064
Expenses.....	1,007,337	1,131,165	10,263,772	11,336,019
Net earnings..	\$450,852	\$563,522	\$4,088,039	\$5,065,045
Per cent. of exps.....	69.1	66.7	71.6	69.1

For the ten months the gross earnings decreased \$2,049,253, or 12.5 per cent., while the expenses decreased \$1,066,247, or 9.4 per cent., leaving a decrease of \$983,006, or 19.4 per cent., in net earnings.

Comparing the two statements we find that the 68 per cent. of the gross earnings of the New York, Pennsylvania & Ohio amounted to \$326,453 for July and \$3,320,035 for the ten months, while the working expenses of that road were \$336,029 for July and \$3,651,569 for the ten months, showing a direct loss of \$9,576 for the month and \$331,534 for the year thus far.

Northern California.—This company has filed articles of incorporation to purchase the California Northern Railroad which extends from Marysville, Cal., to Oroville, 26½ miles. The company has also authority to extend the purchased road and to build branches and connections with other lines. The capital stock is fixed at \$320,000.

Northern Central.—The Baltimore Sun says: "If the arrangements which have been entered into between the city of Baltimore and the Northern Central Railroad Co. for the removal of the old Bolton depot and its transfer along the line of the falls northward to Boundary Avenue are brought to a satisfactory conclusion, what is now one

of the most unsightly parts of the city will become, with other improvements in contemplation, one of the most attractive. The depot in question, which is an inclosed space, bounded by Cathedral, Preston, Dolphin and Foster streets, has been for years an obstruction to travel, and used as it is by the Northern Central company as a coal depot, it has drawn private coal yards about it, and the two together have kept down the value of property in a section of the city possessing many advantages, not only as offering fine sites for residences, but also because its streets can be made to give easy access to the park, to the northern suburbs, and to the very heart of the city. At the present time Cathedral street ends, as it were, in a mud hole, and travel is diverted to other directions. In view of making the change now contemplated plans have been prepared by the engineer of the city, showing what transformations can be effected by the removal of the depot, the improvement of the streets in the vicinity, and the extension of Mount Royal avenue, 125 ft. wide, through the old depot property, across Cathedral street and along Hoffman street, to be increased to a similar width of 125 ft. to North street bridge, where it would tap the line of North street either in its extension to the northern boundary, and thence into the country, or southward into the city. The transfer of the old Bolton depot to the line of the falls, and the erection in the near future of a magnificent depot in the place of the present structure at Union station, are simply preliminary, it is intimated, to the removal of the tracks that now encumber North street, and to make that street the great central avenue to the northern suburbs as well as to Druid Hill Park, by way of Mount Royal avenue, from the point where it touches North street bridge. To all that district lying north of the falls and northward to the park the distance by North street, when freed from its obstructions, will be much shorter than by any other route, and especially will this be the case for those going to the park from the eastern section of the city when Mount Royal avenue is opened from its present terminus at Dolphin street to its prospective terminus at North street bridge. All this, it may be said, lies in the future, and is dependent upon the possession by the city of the old Bolton depot property on the terms and conditions laid down by the act of the Legislature. The difficulty all along in improving Bolton depot out of existence, by coming to terms with the Northern Central Railway Co. has arisen from the fact that at an early day the Legislature authorized the Susquehanna Railroad Co., to whose franchise the Northern Central Railway Co. succeeded, to hold that property in perpetuity. The company could not be removed from it by a city ordinance. It could not be forced to improve it. It would not budge, when urged to do so, but at its own time and on its own terms. And this is why the old Bolton depot, long abandoned of its earlier uses, has stood for many years directly in the pathway of improvements in that quarter, until it became at last an intolerable obstacle to progress in that direction, sealing up streets that ought to be opened and imposing a barrier to others of the greatest importance to the community as a means of enlarging the basis of taxation. The terms and conditions have at last been agreed upon. The city is to have the old depot, and with it the power to make the improvements that are contemplated and already planned. The Northern Central Co. is to exchange the depot property for another and much larger piece of land, which the city has to pay for, paying also the cost of removal. This last change, however, there is reason to hope, will be remitted. There is no doubt that the railway has made a good bargain, and that the city will have to pay for the land to be given in exchange a considerable larger sum than the depot property would fetch if sold out in building lots. Perhaps the difference will be made up in the increased taxable value of the adjacent property. In any event it was a matter of prime necessity to break down the barrier interposed by the old depot property, with a view to further municipal and individual improvements, and this, unless some hitch occurs, has finally been accomplished."

Northern Pacific.—Two companies have been organized in Washington Territory, both of them being controlled by the Northern Pacific. The Northern Pacific & Cascade Co. is organized to purchase and operate the railroads connecting the Cascade Branch of the Northern Pacific with the Carbonado, South Prairie and Wilkeson coal mines, and also to build spurs and branches connecting the road with coal mines and such other points as may seem desirable. The capital stock is \$1,000,000.

The Northern Pacific & Puget Sound Shore Railroad Co. is organized to operate the railroads connecting the Cascade Branch of the Northern Pacific Railroad at Puyallup Junction with the Puget Sound Shore Railroad at Stuck Junction, and also to purchase and operate the Puget Sound Shore Railroad and to build branches and extensions of the same. It is also proposed to build a railroad under this charter from Puyallup Junction to Bellingham Bay, in the extreme northeastern corner of Washington Territory.

Ogdensburg & Lake Champlain.—In the old suit of the Ogdensburg & Lake Champlain Co. against the Nashua & Lowell Co., on which a final hearing was recently had in the United States Circuit Court in Portsmouth, N. H., a decree has been filed, in which it is stated that it appears by a stipulation between the parties, that at the time of filing the plaintiff's bill in the case there were in the hands of the defendant company no gross receipts from business mentioned in the contract referred to in the bill. The Court holds that under and by virtue of said contract, the plaintiff would be entitled to a claim against the defendant company only to the amount of its gross receipts, and the plaintiff having agreed, as shown by the terms of the stipulation filed, that there were in the hands of the defendant no gross receipts, it is ordered and decreed that plaintiff's bill be dismissed, with costs. Counsel for the Ogdensburg & Lake Champlain Co. have filed an appeal to the United States Supreme Court from this decision.

Ohio Central.—The new plan to reorganize this company provides for the issue of a new 5 per cent. bond which shall be exchanged for the old first mortgage bonds with 20 per cent. in preferred stock as a bonus. The first mortgage bondholders are to receive 90 per cent. on the face value of their bonds in the new bonds and 20 per cent. of the face value in preferred stock, and are required to pay \$5 for each \$1,000 bond, to pay the expense of foreclosure and reorganization. The income bondholders are to receive 70 per cent. of the face value of their bonds in preferred stock and are required to pay in an assessment of 10 per cent. in cash. The common stockholders are to receive 50 per cent. of the face value of their stock present in new common stock and must pay in an assessment of 2½ per cent. cash. Holders of car trust bonds are offered new 5 per cent. bonds to the amount of their present holdings. The reorganization, as now proposed, does not now include the River Division, but it is said that an effort will be made to arrange terms with the bondholders of that division. The plan is said to have the approval of a number of large holders of securities, but has not yet been submitted to the bondholders generally, and may be modified.

Pennsylvania.—Some time ago a committee was appointed to investigate and report upon the various systems

of insurance for railroad employes in this and other countries, with a view of establishing some similar system on the Pennsylvania Railroad. The committee has presented its report to the board and it is stated that the company is about to enter upon a plan for the insurance of all its employes against the following contingencies: 1. Death from natural causes. 2. Sickness from natural causes. 3. Death from accident. 4. Inability to labor, resulting from accident. 5. Inability to labor, by reason of old age; the age to be not less than 60 years after 10 years continuous service with the company.

Instructions have been issued to officers in charge of the several departments of the road to fill blanks, giving the name, age, date of entering the service of the company, present position and present salary of each employe. After this information has been collected a decision will be reached as to what percentage of an employe's salary shall be paid for insurance in the proposed fund. It is understood that the amount to be paid to an employe when disabled by accident or sickness, or when retired on account of old age, will be one-half his salary when actively employed, but the amount to be paid to the heirs of the deceased employe has not yet been settled on, and other details of the plan are not to be worked out.

Philadelphia & Reading.—There is a good deal of talk on the Philadelphia stock market to the effect that the New Jersey Central stock which was owned by this company, and which Mr. Vanderbilt some time ago agreed to carry, has been sold or at least part of it. It is stated that a number of certificates have appeared on the Philadelphia market which are included in the stock transferred to Mr. Vanderbilt, leaving no doubt of the fact that some, at least, of the stock has been sold. It is claimed by the officers of the Reading that under the agreement with Mr. Vanderbilt he will be obliged to return this stock to the company, and of course he will have to buy it back in order to do so.

Pittsburgh, Cleveland & Toledo.—The Pittsburgh Chronicle-Telegraph reports that a lot of \$360,000 of the 6 per cent. bonds of this company have been sold at 105 flat. A previous lot had been placed at 102½ flat. The road, it will be remembered, is now leased to the Pittsburgh & Western, which is controlled by the Baltimore & Ohio, and the Pittsburgh, Cleveland & Toledo bonds have practically a Baltimore & Ohio guarantee.

Rochester & Pittsburgh.—In Albany, N. Y., Sept. 9, application was made to the Attorney-General of the state, requesting him to bring an action to dissolve this company and to have a receiver appointed for its property. The petition to the Attorney-General sets forth that the present company was a consolidation of five other companies, two in Pennsylvania, and three in New York, and charges that it has issued \$10,000,000 in stock, being \$3,000,000 in excess of the consolidated capital stocks of the different companies. This, it is claimed, is illegal, and on this ground the Attorney-General is asked to dissolve the corporation. After hearing arguments he reserved his decision.

Rock Island & Mercer County.—The statement of this company to the Illinois Railroad Commissioners for the year ending June 30 shows that the capital stock is \$50,000, and the total liabilities \$900,000. The length of track owned by the company is 30 miles. It has 4 locomotives, 33 cars, and employs on an average 100 men. The total earnings for the year were \$79,978, the expenses \$53,853, leaving the net earnings \$26,125. The interest and other payments absorbed \$17,971, leaving a surplus of \$8,084 for the year.

San Antonio & Aransas Pass.—It is said that the International & Great Northern Co. has made a proposition to this new company to give the road the use of the International track for a considerable distance as far as it can be conveniently used as part of the proposed line and also to give the new road the use of its terminal facilities in San Antonio. The object it is supposed is to secure the traffic of the new road as a feeder.

Sea Isle & Ocean City.—This road is now completed to Ocean City, N. J., 12 miles north by east from the starting point at Sea Isle City. The road, which is really an extension of the Sea Isle Branch of the West Jersey road, runs from Sea Isle along Peck's Beach and Ludlam's Beach close to the seashore, and reaches Ocean City, where it is expected that a large summer resort will be built up. It will hereafter probably form a part of the line which the Pennsylvania Railroad is gradually building up along the New Jersey coast from Long Branch to Cape May.

Sioux Falls, Fairbank & Western.—This company has been incorporated to build a railroad from Fairbank, Dak., westward to some point in the Black Hills, hereafter to be decided on. The company expects to begin work as soon as the preliminary lines can be run and the road located.

Stewarttown Branch.—It is proposed to build a branch line from the Northern Central road at Shrewsbury, in York County, Pa., to Stewarttown, a distance of about seven miles. A company has been formed and sufficient subscriptions secured from the residents along the line, who are chiefly wealthy farmers. The road will be a branch of the Northern Central.

St. Louis & Cairo.—Trestle bridges are being put in at several points on the southern division of this road, where the embankments have suffered from wash-outs in the wet season. It is said that 12 miles on the southern end of the road from Cairo to Hodge's Park are to be raised considerably, in order to be above the mark of the highest flood ever known at that point.

St. Louis & San Francisco.—The new Bolivar Branch has been completed and opened for business as far as Buckley, Mo., 21 miles northward from Springfield. Work is progressing on the extension of the branch to Bolivar.

Western Union Telegraph.—This company's statement for the quarter ending Sept. 30 is as follows:

Net earnings (partly estimated).....	\$1,750,000
Surplus, July 1.....	4,157,469
Total.....	\$5,907,469
Interest and sinking funds (less \$40,000 returned by trustees).....	104,000
Balance.....	\$5,803,469

The usual quarterly dividend (1½ per cent.) has been declared, which will require \$1,399,810 for its payment, leaving a balance of \$4,403,659 on hand.

Wisconsin Central.—This company's extension from Chippewa Falls, Wis., to St. Paul, Minn., 102 miles, is rapidly nearing completion. Since May 1 over one million and a quarter cubic yards of earth have been moved by the contractors, Wells, Harrison & Green, of Milwaukee, Wis., who have also put in all the timber and piling in the trestles and other bridges. Tracklaying is now progressing at the rate of a mile and a half a day, the ballasting being finished as fast as the track is laid, and it is expected that the road will be completed to St. Paul by Nov. 1 next.